The Only Journal With a Paid Circulation in the Rock Products Industry

Rock Products

Vol. XXIII, No. 22 CHICAGO October 23, 1920

EDITORIAL DEPARTMENT—
Nathan C. Rockwood, Editor
Chas. A. Breskin, Assistant Editor

BUSINESS DEPARTMENT—
Geo. P. Miller, Manager.

EASTERN OFFICE—
Chas. A. Fuller, Manager, 101 West 41st Street, New York City, N. Y.

CIRCULATION DEPARTMENT—
H. J. Wolfe, Manager. Circulation 5300 copies net. Applicant for membership Audit Bureau of Circulation.

SUBSCRIPTION—Two dollars a year to U. S. and Possessions. Three dollars a year to Canada and foreign countries. Twenty-five cents for single copies.

TO SUBSCRIBERS—Date on wrappers indicates issue with which your subscription expires. In writing to have address changed, give old as well as new address.

POST-OFFICE ENTRY — Entered as second-class matter, July 2, 1907, at the Chicago, Ill., Post-office, under the Act of March 3, 1879.

PUBLICATION—Published every other Saturday by

TRADEPRESS PUBLISHING CORP.
542 South Dearborn Street, Chicago, Ill.

W. D. Callender, President.
T. J. Sullivan, Vice-President.
Geo. P. Miller, Treasurer.
C. O. Nelson, Secretary.

TABLE OF CONTENTS

FEATURE ARTICLES

Missouri Crushed Stone Producer Sells to Cement Manufacturer.....17, 18
Interesting details of quarry operation and crushing plant of Edward Hely Crushed Stone Co., Cape Girardeau, Mo.

Los Angeles' Remarkable Gravel and Boulder Deposits.....19, 20, 21, 22, 23
Description of wonderful deposits of gravel near Los Angeles—Unique gravity railways.

Washington Plant of Lehigh Company Resumes Operation..... 23
Lehigh Portland Cement Co. completes flume construction at Metaline Falls, Wash., at cost of over $125,000.

Mineral Aggregate Industry of Portland, Oregon.....26, 27, 28, 29, 30, 31
Portland so situated as to obtain sand from Columbia River, gravel from Willamette River, and crushed stone from plants on Columbia River.

Practical Chemistry for Lime and Cement Manufacturers.....32, 33
Thermo chemistry—The chemistry of the combustion of fuel.

To Expand National Agricultural Limestone Association's Activities..34, 35
Association will be reorganized so as to be composed of state groups or districts—Discussion on proposed uniform lime law.

National Agricultural Limestone Association on Lime Law..... 36
Report of committee on proposed uniform agricultural lime law.

DEPARTMENTS

Hints and Helps for Superintendents.....24, 25
Box-car loader—Limestone wagon bins—Cement-slurry kiln-feed indicator—Concrete conveyor gallery.

Editorial Comment 38, 39
Railway efficiency—Uniform cost keeping—Industrial Expositions—Mishandling coal problem blasts hopes of construction industry—Plenty of cars for fertilizers—Department of Justice begs for lower coal prices.

Accident Prevention 40
Safe use of hoisting apparatus—Ninth annual safety congress at Milwaukee.

General News from Rock Products Industries.....
.....37, 41, 44, 45, 46, 50, 51, 52, 53
National Lime Association activities—See no hope of lower prices of building materials—New interstate commerce rules—Sand and gravel men lose fight for just car supply—National plastering code in progress.

New Machinery and Equipment.....42, 43
Motor trucks in quarries—New light rock drill—Dispatching and routing motor trucks.

Current Prices of Rock Products.....47, 48, 49

News of the Industry.....54, 55

For Index to Advertisements See Page 79

The Only Journal With a Paid Circulation in the Rock Products Industry

Rock Products

Vol. XXIII, No. 22 CHICAGO October 23, 1920

EDITORIAL DEPARTMENT—
Nathan C. Rockwood, Editor
Chas. A. Breskin, Assistant Editor

BUSINESS DEPARTMENT—
Geo. P. Miller, Manager.

EASTERN OFFICE—
Chas. A. Fuller, Manager, 101 West 41st Street, New York City, N. Y.

CIRCULATION DEPARTMENT—
H. J. Wolfe, Manager. Circulation 5300 copies net. Applicant for membership Audit Bureau of Circulation.

SUBSCRIPTION—Two dollars a year to U. S. and Possessions. Three dollars a year to Canada and foreign countries. Twenty-five cents for single copies.

TO SUBSCRIBERS—Date on wrappers indicates issue with which your subscription expires. In writing to have address changed, give old as well as new address.

POST-OFFICE ENTRY — Entered as second-class matter, July 2, 1907, at the Chicago, Ill., Post-office, under the Act of March 3, 1879.

PUBLICATION—Published every other Saturday by

TRADEPRESS PUBLISHING CORP.
542 South Dearborn Street, Chicago, Ill.

W. D. Callender, President.
T. J. Sullivan, Vice-President.
Geo. P. Miller, Treasurer.
C. O. Nelson, Secretary.

TABLE OF CONTENTS

FEATURE ARTICLES

Missouri Crushed Stone Producer Sells to Cement Manufacturer.....17, 18
Interesting details of quarry operation and crushing plant of Edward Hely Crushed Stone Co., Cape Girardeau, Mo.

Los Angeles' Remarkable Gravel and Boulder Deposits.....19, 20, 21, 22, 23
Description of wonderful deposits of gravel near Los Angeles—Unique gravity railways.

Washington Plant of Lehigh Company Resumes Operation..... 23
Lehigh Portland Cement Co. completes flume construction at Metaline Falls, Wash., at cost of over $125,000.

Mineral Aggregate Industry of Portland, Oregon.....26, 27, 28, 29, 30, 31
Portland so situated as to obtain sand from Columbia River, gravel from Willamette River, and crushed stone from plants on Columbia River.

Practical Chemistry for Lime and Cement Manufacturers.....32, 33
Thermo chemistry—The chemistry of the combustion of fuel.

To Expand National Agricultural Limestone Association's Activities..34, 35
Association will be reorganized so as to be composed of state groups or districts—Discussion on proposed uniform lime law.

National Agricultural Limestone Association on Lime Law..... 36
Report of committee on proposed uniform agricultural lime law.

DEPARTMENTS

Hints and Helps for Superintendents.....24, 25
Box-car loader—Limestone wagon bins—Cement-slurry kiln-feed indicator—Concrete conveyor gallery.

Editorial Comment 38, 39
Railway efficiency—Uniform cost keeping—Industrial Expositions—Mishandling coal problem blasts hopes of construction industry—Plenty of cars for fertilizers—Department of Justice begs for lower coal prices.

Accident Prevention 40
Safe use of hoisting apparatus—Ninth annual safety congress at Milwaukee.

General News from Rock Products Industries.....
.....37, 41, 44, 45, 46, 50, 51, 52, 53
National Lime Association activities—See no hope of lower prices of building materials—New interstate commerce rules—Sand and gravel men lose fight for just car supply—National plastering code in progress.

New Machinery and Equipment.....42, 43
Motor trucks in quarries—New light rock drill—Dispatching and routing motor trucks.

Current Prices of Rock Products.....47, 48, 49

News of the Industry.....54, 55

For Index to Advertisements See Page 79

Big Road Job Completed on Time

K. E. Lancet, Indiana's Assistant Highway Engineer, complimented The Cunningham Construction Company because it completed an 8-mile stretch of highway on time.

The road, near Coatesville, Indiana, was 18 ft. wide, six inches thick at the shoulders and eight inches thick in center,---honestly built within both time and material specifications.

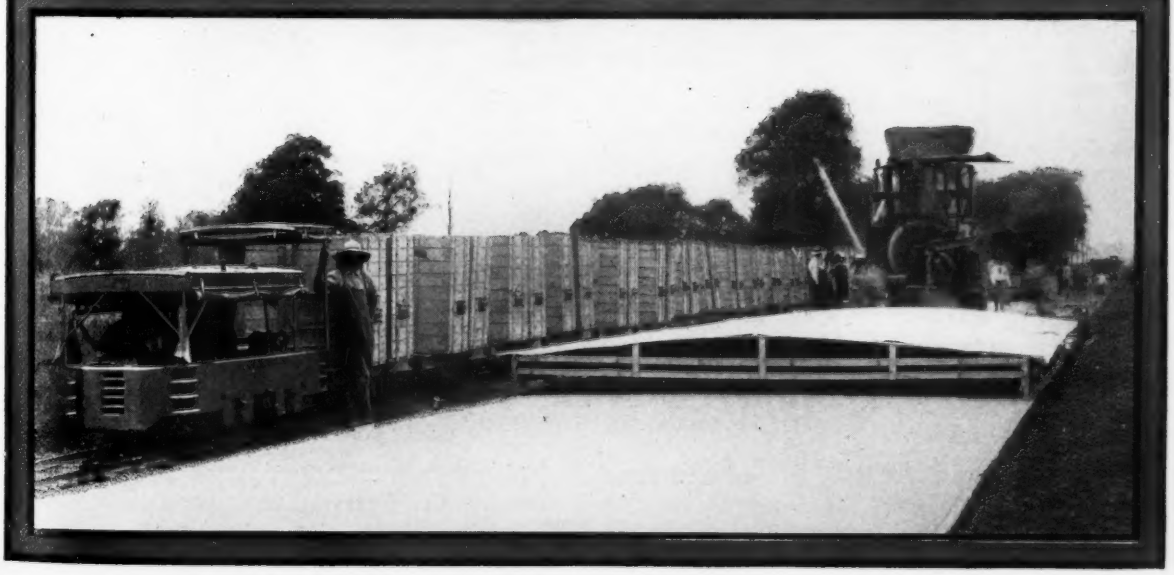
Three husky PLYMOUTH Gasoline Locomotives played a big part. They kept a hundred batch boxes constantly on the move, and the big cement ribbon crept along at the rate of 500 feet daily.

The use of PLYMOUTH Gasoline Locomotives in road construction is not only a necessity but a habit. A given stretch of highway holds just so much material, whether built in a day or year. The profit saving is in the time saving. The Plymouths keep the mixture flowing and the ribbon growing. Ask the man who bought and used.

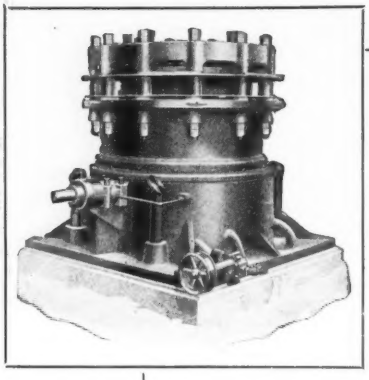
The Fate-Root-Heath Company - Plymouth, Ohio, U. S. A.

PLYMOUTH

Gasoline Locomotives



ROCK CRUSHERS

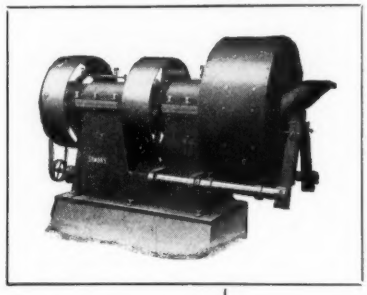


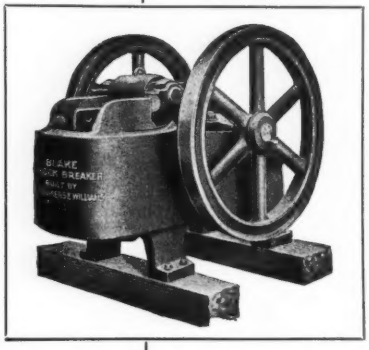
Symons Vertical Disc Crusher

A large capacity crusher requiring low horse power. It gives a uniform product and has a wide range of reduction.

The Symons Disc Crusher

An improved type with revolving manganese discs which combine a rocking movement to prevent "packing" trouble when small sizes are crushed.



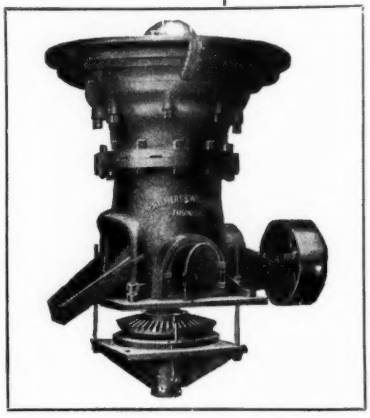


The Blake Rock Breaker

A sturdy design with minimum number of wearing parts. The crushing plates can be reversed and reused.

Bronze Ball Gyratory Crusher

A machine having a ball and socket seat for the main shaft to give a large bearing surface and to reduce re-babbitting to a minimum.

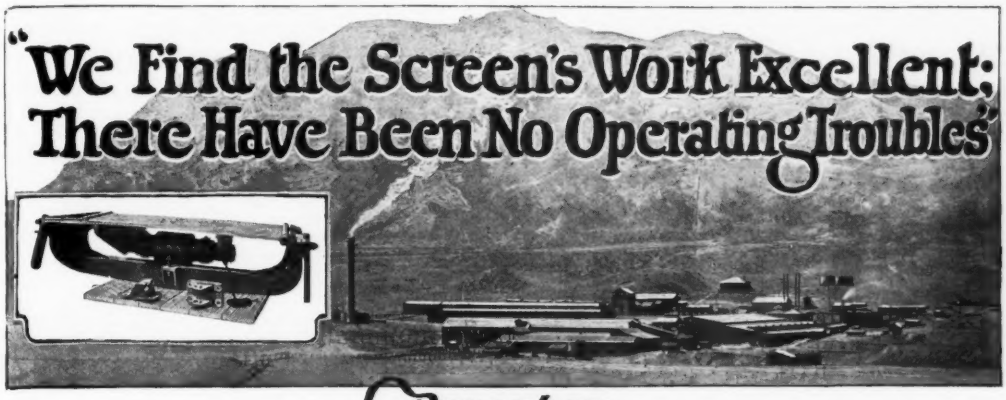


Manufactured and Sold by

CHALMERS & WILLIAMS

1425 Arnold Street CHICAGO HEIGHTS, ILLINOIS

New York 120 Broadway | Los Angeles 933 Central Bldg. | San Francisco 1306 Merchants National Bank Bldg. | Salt Lake City 307 Dooly Block | Portland 1207 Gasco Bldg. | Seattle L. C. Smith Bldg.



Report on

MITCHELL ELECTRIC VIBRATING SCREEN

Read the letter reprinted below. Conceive of it as expressing the opinion of screen experts in scores of companies representing seven different industries, and you have the general opinion prevalent among those who are operating the Mitchell Electric Vibrating Screen.

This letter speaks of the screen's work in classifying ore. But you may depend upon the same high efficiency in your screening work, no matter what material you may be handling.

THE GOLDEN CYCLE
MINING AND REDUCTION COMPANY

The Stimpson Equipment Company,
317 Felt Building,
Salt Lake City, Utah.

Gentlemen:

We have now had your Mitchell Electric Vibrating Screen working for eight (8) months.

The feed is sampled ore 3-in. and smaller plus a return from a Symonds Crusher about 1½-in. and smaller.

The object of screening is to remove the fines (which contain considerable moisture)—3 mesh, from the feed to the Kiminuters. Average feed to screen 60 tons per hour. Per cent of fines removed varies from 25% to 35%.

We find the screen's work excellent and so far there have been no operating troubles.

Yours very truly,

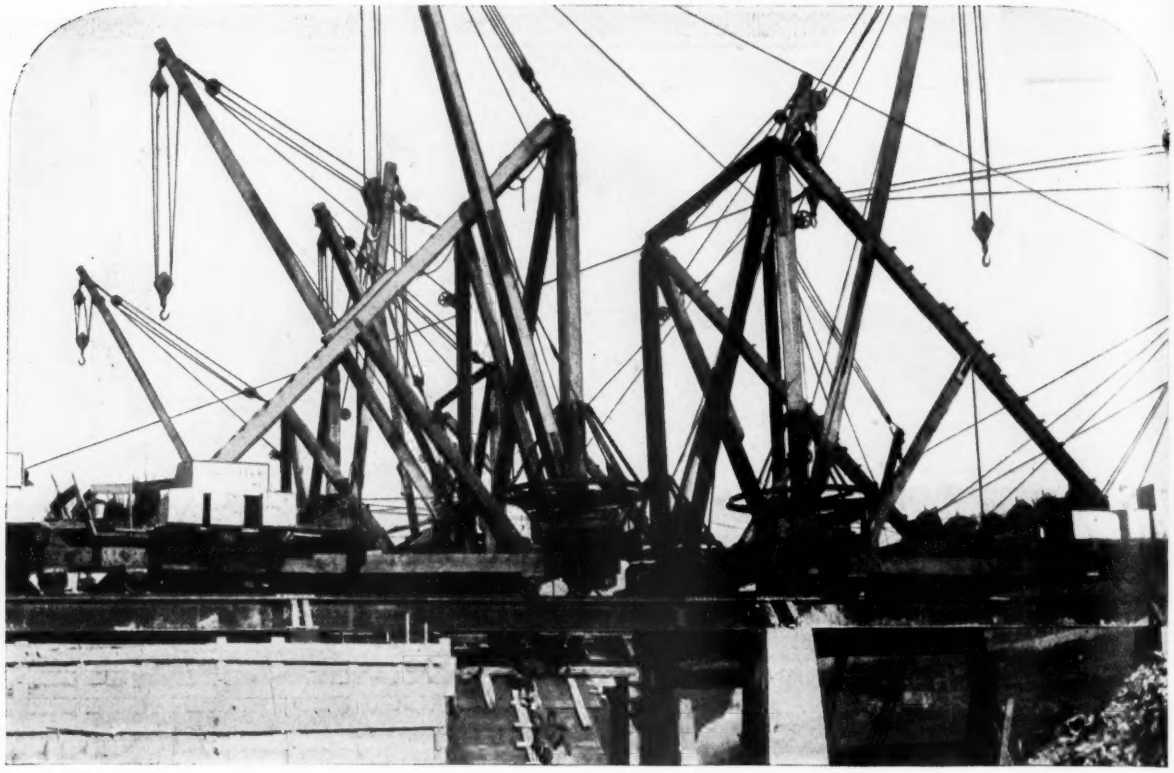
(Signed) A. S. Blomfield.

P. S. The photo you requested we hope to forward in a few days.

Send for our Mitchell Screen illustrated booklet

Stimpson Equipment Company

315 Felt Building **Salt Lake City**



How "AMERICAN" Derricks Helped New Yorkers Get Drinking Water

The Kensico dam, an important link in the wonderful system that supplies New York with water to drink and bathe in and put out its fires, was rushed to completion by using "AMERICAN" Traveling Derricks.

Working eight hours a day, this fleet of "AMERICAN" Traveling Derricks in twenty-five days laid 49,580 cubic yards of cyclopean masonry and stored 4,953 cubic yards of concrete blocks for future use.

This is but one instance of many where nationally-known contractors have used "AMERICAN" Derricks because experience has taught them that "AMERICAN" Derricks can be depended upon to handle maximum loads speedily, surely, safely.

Whatever your lifting problems may be, an "AMERICAN" Derrick will simplify them.

No matter where you are, an "AMERICAN" representative can reach you in twenty-four hours.

"Give me where I may stand and I will move the world"

American Hoist & Derrick Co.

Saint Paul Minnesota

Builders of "AMERICAN"

Hoisting Engines	Locomotive Cranes	Sugar Cane Machinery
Electric Hoists	Railroad Ditchers	Marine Deck Machinery and Tackle
Derricks	Logging Equipment	The Genuine "CROSBY" Wire Rope Clip

New York Chicago Pittsburgh Seattle New Orleans Detroit

AMERICAN
HOIST & DERRICK CO.

When writing advertisers please mention ROCK PRODUCTS

What the men who use them have to say about Jeffrey Radial Loaders

Extracts from a few of the letters received from customers:

Eugene Graham, Cortland, N. Y.

"The Jeffrey Radial Loader which I have had in operation for the past five months has given very good satisfaction and I have no difficulty in loading at the rate of one cubic yard per minute. I shall be glad to show your machine to prospective customers."

N. W. Purdy, County Surveyor, Holmes Company, Millersburg, Ohio.

"I consider the Jeffrey Radial Loader the ideal machine to fill the gap that has hitherto existed in industrial equipment between the hand shovel and the steam shovel."

Indianapolis and Cincinnati Traction Company, Rushville, Ind. (S. C. Weggener, Chief Engineer.)

"We have been able to handle coal on flat cars at the rate of 50 tons per hour with your Type "K" Radial Loader, which is all we feel that could be asked from a machine of this character."

The James R. Gloyd Company, General Construction, Cleveland, Ohio.

"You will be interested to have our statement that the Jeffrey Radial Loader in actual operation has exceeded our expectations. We have a number of times loaded our 5-ton truck in 6 minutes with Sand, Gravel or Conglomerate."

Jeffrey Radial Loaders

Dig 8 to 10 feet into the pile—
Do not require hand shoveling or mechanical devices to bring material to buckets—
Release 5 to 10 men for other work—
Can be operated by unskilled labor—
Maintenance Costs are small.

Are built in two sizes:

"Type K" has a capacity of 1 cubic yard of Sand, Gravel, Crushed Stone, Coal, Ashes, etc., per minute.

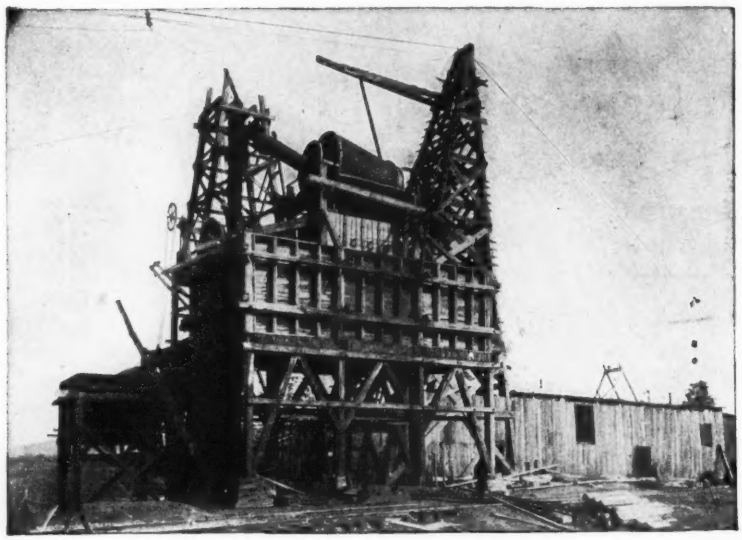
"Type G"—1½ to 2 cubic yards per minute.

Catalogs No. 288-N and 309-H fully illustrate and describe both types of Radial Loaders—Send for copies

The Jeffrey Mfg. Co. 935 North Fourth St. Columbus, Ohio

New York, Boston, Scranton, Buffalo, Philadelphia, Cleveland, Pittsburgh, Chicago, St. Louis, Charleston, W. Va., Dallas, Milwaukee, Los Angeles, Denver, Montreal, Detroit

Manufacturers of Pulverizing, Conveying and Elevating Machinery; Chains; Self-Propelling Loaders; Electric Trolley and Storage Battery Locomotives, etc.



WEBSTER SERVICE

The service record of any equipment is the real basis on which to judge it. Leading industries have largely standardized on Webster conveying equipment because, over a period of years, it has demonstrated an ability to stand up under severe operating conditions. Although each installation is especially designed for the work it will be called upon to perform, yet it can be quickly and economically erected and subsequently enlarged to keep pace with expansion.

Webster engineers have set a standard for real dependability in the design of material handling machinery, and are able to plan in detail the labor conserving equipment, which will exactly suit your needs.

If you have an elevator or conveying problem, why not solve it NOW?

WEBSTER

THE WEBSTER MFG. COMPANY

4500-4560 CORTLAND STREET

CHICAGO

FACTORIES CHICAGO AND TIFFIN, OHIO. SALES OFFICES IN PRINCIPAL CITIES

When writing advertisers please mention ROCK PRODUCTS

With Labor at 75c. an Hour, How Much Does This "BROWNING" Save?

CAN you imagine what it would cost to load these five and seven-ton castings by hand labor? A Browning Crane, equipped with a magnet, picked them up and loaded them in a few minutes—think of the saving in cost and the number of men released for other work.

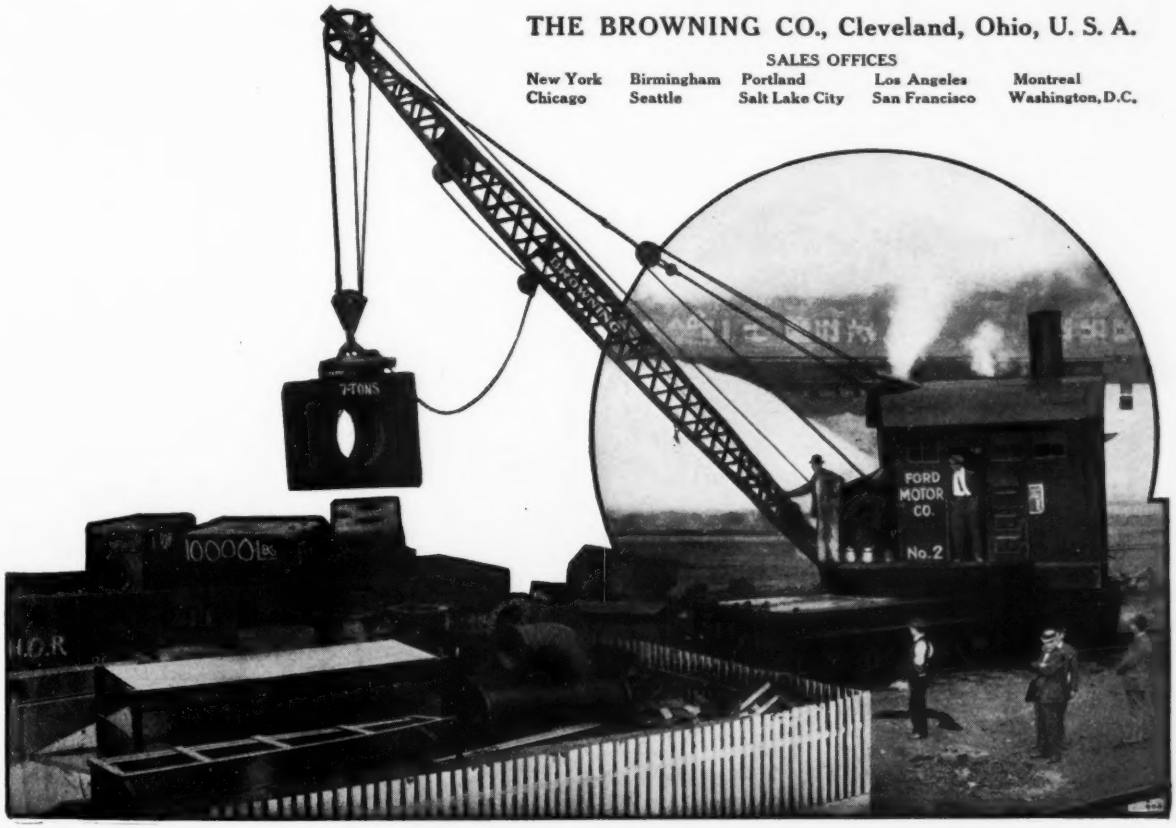
When you consider that this same "Browning" can, in a few minutes, be equipped to handle coal, make an excavation, place concrete, erect structural steel or drive piles, its value to an industrial plant or to a contractor becomes apparent.

A catalog showing a multiplicity of operations that can profitably be performed by a Browning Locomotive Crane will be sent on request.

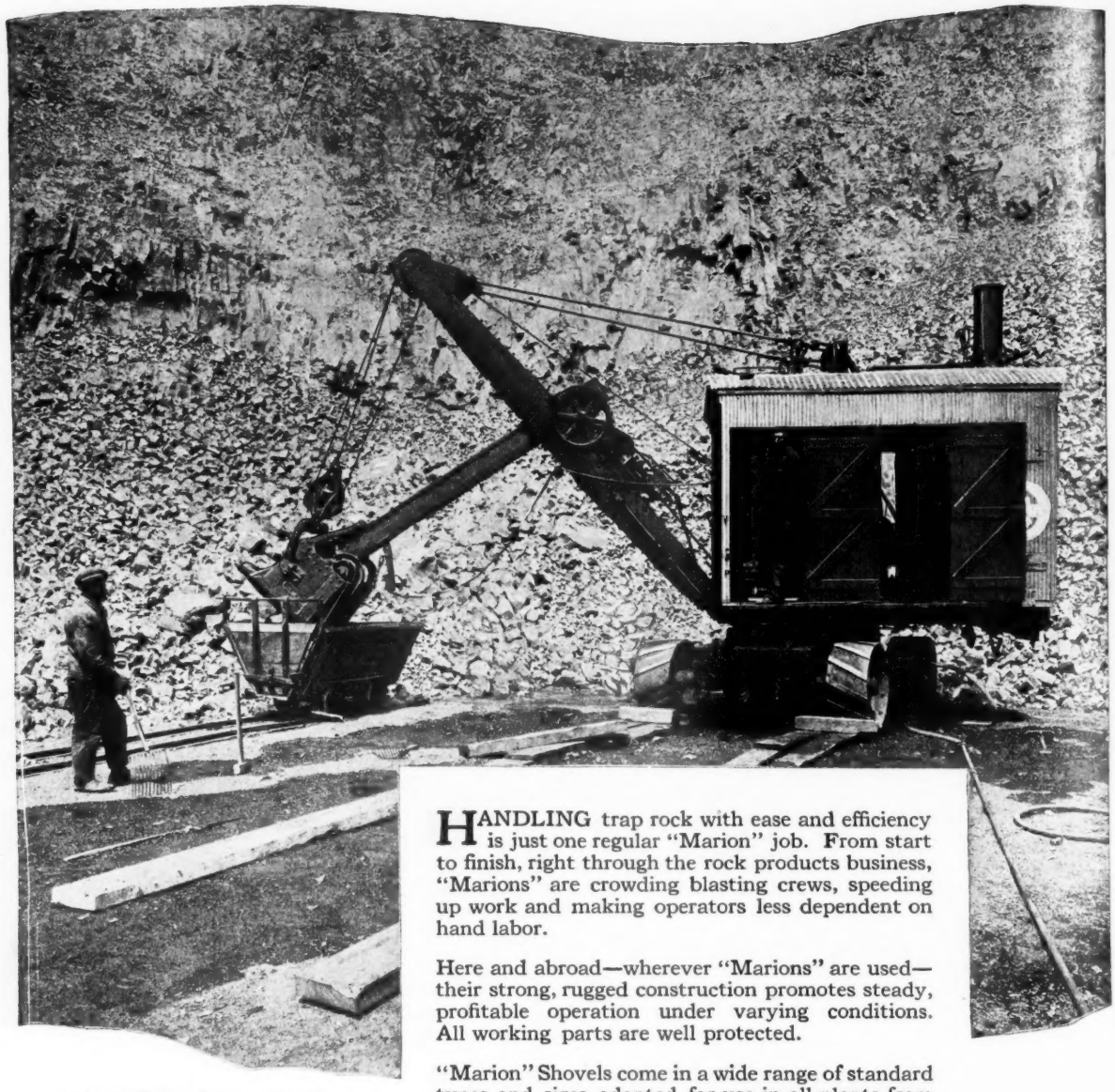
THE BROWNING CO., Cleveland, Ohio, U. S. A.

SALES OFFICES

New York	Birmingham	Portland	Los Angeles	Montreal
Chicago	Seattle	Salt Lake City	San Francisco	Washington, D.C.



BROWNING
LOCOMOTIVE CRANES



Union Building and Construction Co.
Passaic, N. J.

HANDLING trap rock with ease and efficiency is just one regular "Marion" job. From start to finish, right through the rock products business, "Marions" are crowding blasting crews, speeding up work and making operators less dependent on hand labor.

Here and abroad—wherever "Marions" are used—their strong, rugged construction promotes steady, profitable operation under varying conditions. All working parts are well protected.

"Marion" Shovels come in a wide range of standard types and sizes adapted for use in all plants from the very large to the very small. And our policy of concentrated production assures every "Marion" customer quicker deliveries than formerly.

Our thirty-six years of sound, successful, shovel-making experience is free for you to draw upon. We're always glad to furnish recommendations and estimates—write us today all about *your* problem.

THE **Marion** STEAM SHOVEL CO.

Established 1884 Marion, Ohio

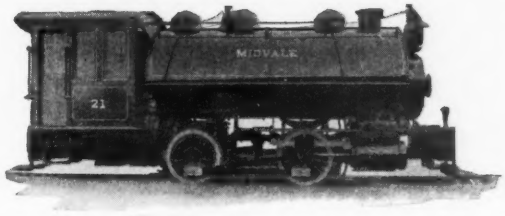
New York Chicago Atlanta San Francisco

Billings, Mont., F. B. Connelly Co.
Dallas, F. B Wright, Bush Bldg.
Denver, - H. W. Moore & Co.
Detroit, - W. H. Anderson Tool & Sup. Co.
Philadelphia, H. L. Cox, 13th & Cherry Sts.
Pittsburgh, - J. W. Patterson
Portland, Clyde Equipment Co.
Salt Lake City, H. W. Moore & Co.
Seattle, Clyde Equipment Co.
Montreal, Toronto, Vancouver, Vancouver Mach. Depot, Ltd.
F. H. Hopkins & Co., Ltd.

EVERYWHERE-RELIABLE
The Marion Steam Shovel Co.
ESTABLISHED 1884

VULCAN INDUSTRIAL LOCOMOTIVES and leading Industrial Concerns

III. Midvale Steel and Ordnance Company

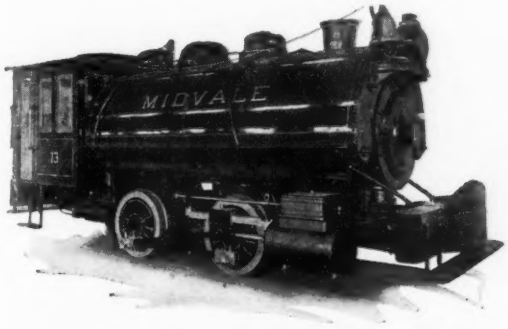


The name Midvale has for years been associated with the manufacture of armor for naval fighting craft.

VULCAN Locomotives here, as in many other plants, are called upon to do heavy and continuous work.

Into the design and construction of every VULCAN Locomotive enter the many factors which are obtained only as the result of many years of experience in building thousands of locomotives.

Haulage problems vary with different industries and even with different plants. It is part of the work of the VULCAN Engineering Department to make the design of the locomotive conform to the tasks it is to perform.

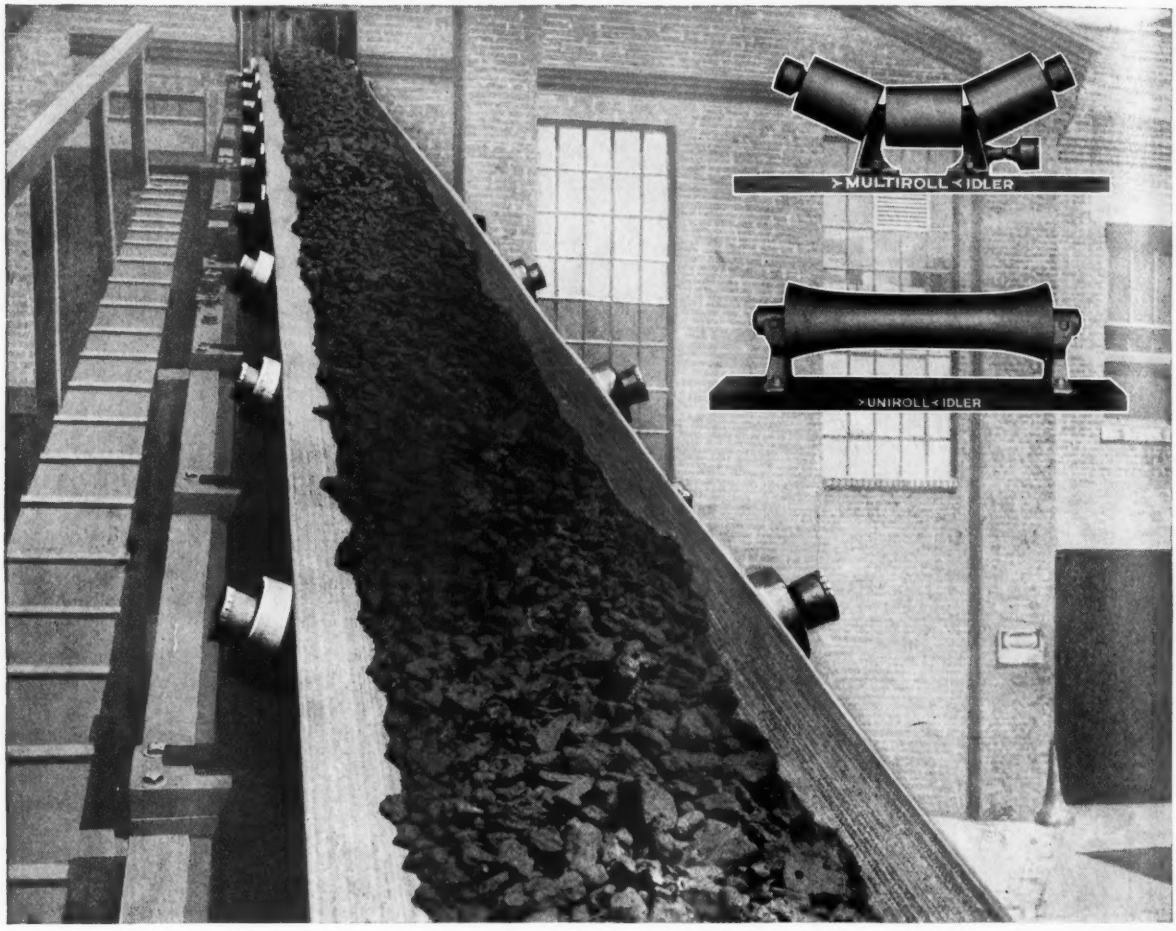


VULCAN IRON WORKS

Established 1849

1753 Main St. **Wilkes-Barre, Pa.**

Belt Conveyors



THE Link-Belt Company is the recognized pioneer in the art of conveying materials, and our various elevating and conveying devices today represent the highest development of their respective types.

The belt conveyor is one of the oldest known conveying devices, and has a wide field of usefulness. This type of conveyor can be run at relatively high speeds, is well adapted for large capacities, and particularly for conveying long distances.

Let our engineers give you the benefit of their extensive experience in the selection of the right equipment for the handling of your material. We make all types of elevators and conveyors. Catalogs sent on request.

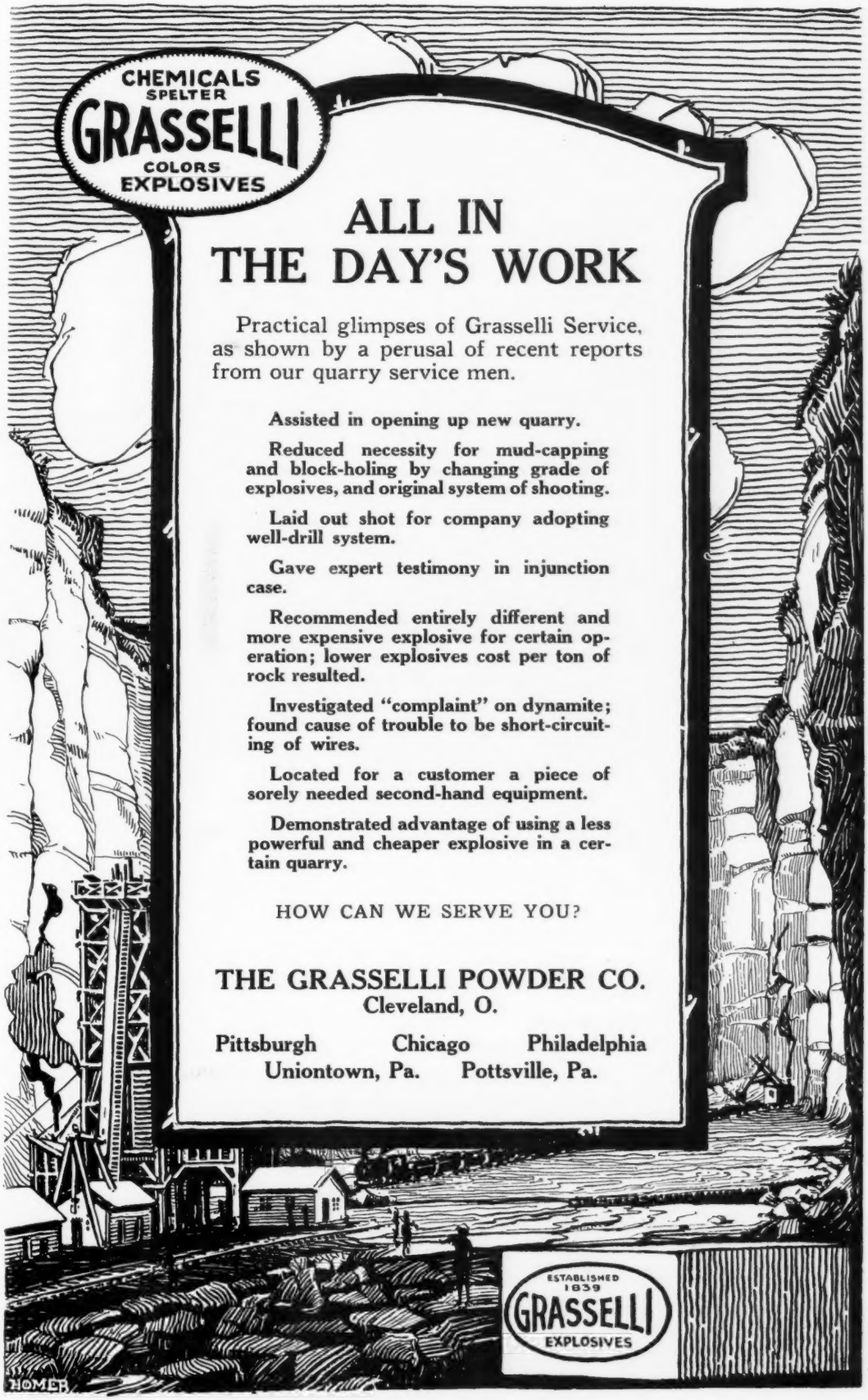
633

PHILADELPHIA	CHICAGO	LINK-BELT COMPANY		INDIANAPOLIS	TORONTO
New York	299 Broadway	Huntington, W. Va	Robson-Prichard Bldg.	San Francisco	168 Second St.
Boston 9	49 Federal St.	Cleveland	429 Kirby Bldg.	Los Angeles	163 N. Los Angeles St.
Pittsburgh	1501 Park Bldg.	Detroit	4210 Woodward Ave.	Toronto, Can.	Canadian Link-Belt Co., Ltd.
St. Louis	Central Nat'l Bank Bldg.	Kansas City, Mo.	306 Elmhurst Bldg.	Denver	Lindrooth, Shubart & Co., Boston Bldg.
Buffalo	47 Elliott Square	Seattle	820 First Ave., S.	Louisville, Ky.	F. Wehle, Starks Bldg.
Wilkes-Barre	2d Nat'l Bank Bldg.	Portland, Ore.	First and Stark Sts.	New Orleans	C. O. Hins, Hibernia Bank Bldg.
	Birmingham, Ala.		S. L. Morrow, 720 Brown-Marx Bldg.		

LINK-BELT

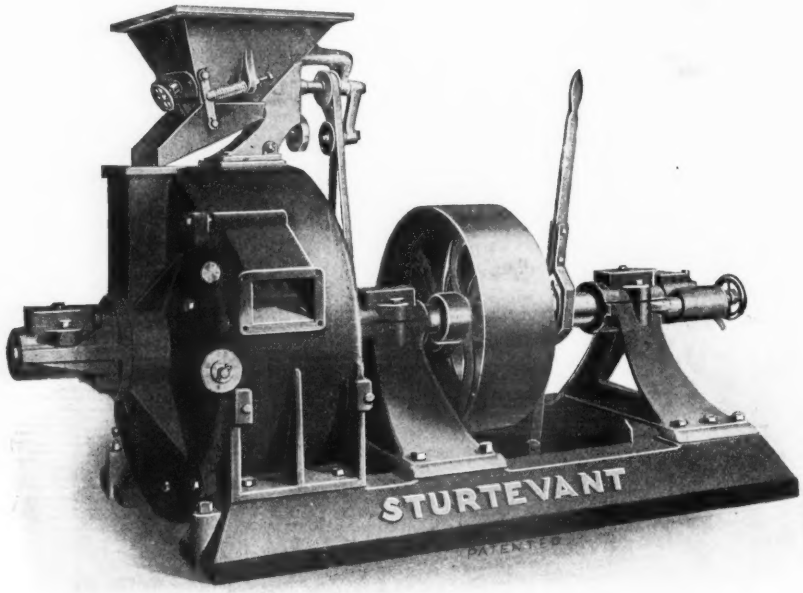
Elevators and Conveyors

When writing advertisers please mention ROCK PRODUCTS


CHEMICALS
SPELTER
GRASSELLI
COLORS
EXPLOSIVES
ALL IN
THE DAY'S WORK
Practical glimpses of Grasselli Service, as shown by a perusal of recent reports from our quarry service men.
Assisted in opening up new quarry.
Reduced necessity for mud-capping and block-holing by changing grade of explosives, and original system of shooting.
Laid out shot for company adopting well-drill system.
Gave expert testimony in injunction case.
Recommended entirely different and more expensive explosive for certain operation; lower explosives cost per ton of rock resulted.
Investigated "complaint" on dynamite; found cause of trouble to be short-circuiting of wires.
Located for a customer a piece of sorely needed second-hand equipment.
Demonstrated advantage of using a less powerful and cheaper explosive in a certain quarry.
HOW CAN WE SERVE YOU?
THE GRASSELLI POWDER CO.
Cleveland, O.
Pittsburgh Chicago Philadelphia
Uniontown, Pa. Pottsville, Pa.
ESTABLISHED
1839
GRASSELLI
EXPLOSIVES
HOMER

STURTEVANT "ONE-MAN ONE-MINUTE" "OPEN-DOOR" MACHINERY

CRUSHERS, GRANULATORS, GRINDERS, PULVERIZERS, SCREENS, MIXERS, ELEVATORS, CONVEYORS, CHUTES.



VERTICAL ROCK EMERY MILL

For the Grinding of Soft and Moderately Hard Materials to a Fine Powder Without Screens.
Practically the Standard for Burned Lime, Clay, Shale, Chalk, Talc, Salt, Coal, Facings, Ochres, Umber, Siennas, etc.

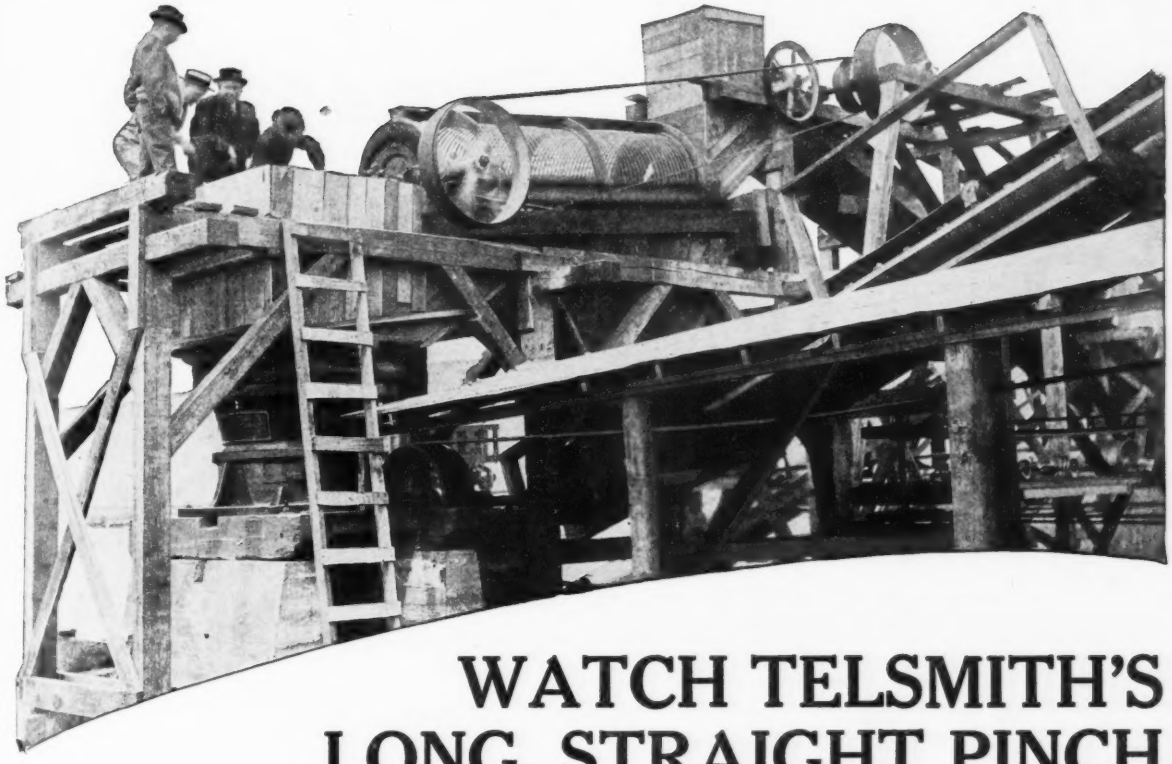
THE GRINDING STONES

The periphery or skirt is formed of blocks of Rock Emery, because here the hardest work is done; the bosom and the furrows are of softer stone, because these require dressing as they wear.

Do not confuse Emery Millstones with old-fashioned Buhrs or Esopus Stones that require dressing or sharpening every few days, for massive Rock Emery is so hard that it is difficult to cut at all. It stays sharp, wears well, in fact, often saves its cost in dressing alone over other millstones. The centers and furrows, which are made of softer stone, occasionally have to be cut out to allow free entrance and discharge of the material, but that is a simple and easy matter.

These machines are complete in themselves, and run without vibration on any good mill floor. Right or left hand discharge, as ordered; automatic feed as shown.

STURTEVANT MILL CO., BOSTON MASS.



WATCH TELSMITH'S LONG, STRAIGHT PINCH

See the boys in the upper left-hand corner of the picture? They are watching a Telsmith Primary Breaker crush "hard-heads." The boulders get only one pinch apiece—and that goes for the big, black, shiny fellows too. They don't slip; and they don't jump. If they did, our friends above the crusher wouldn't be there very long. But the Telsmith head GYRATES HORIZONTALLY. The crushing stroke is the same length at the top of the bowl as at the bottom. It grips big, smooth, water-washed boulders solidly—cracks 'em—crushes 'em—discharges 'em—all without any fuss or frolic—all just in the day's work.

Now, let us ask you a question. How would you like to stand close above any other breaker, jaw or gyratory, while it was crushing hard gravel? No reply is necessary; but just figure out for yourself what Telsmith's parallel pinch means in terms of reduced labor and increased output.

Does your catalog file include data about Telsmith Primary Breaker—the crusher with the RIGID SHAFT, the short frame, low-arch crown, big eccentric and force-feed lubrication? If not, you had better send for catalog No. 166 (Telsmith Primary Breaker) and Bulletin No. 2-F-11 (Telsmith Reduction Crusher).

SMITH ENGINEERING WORKS

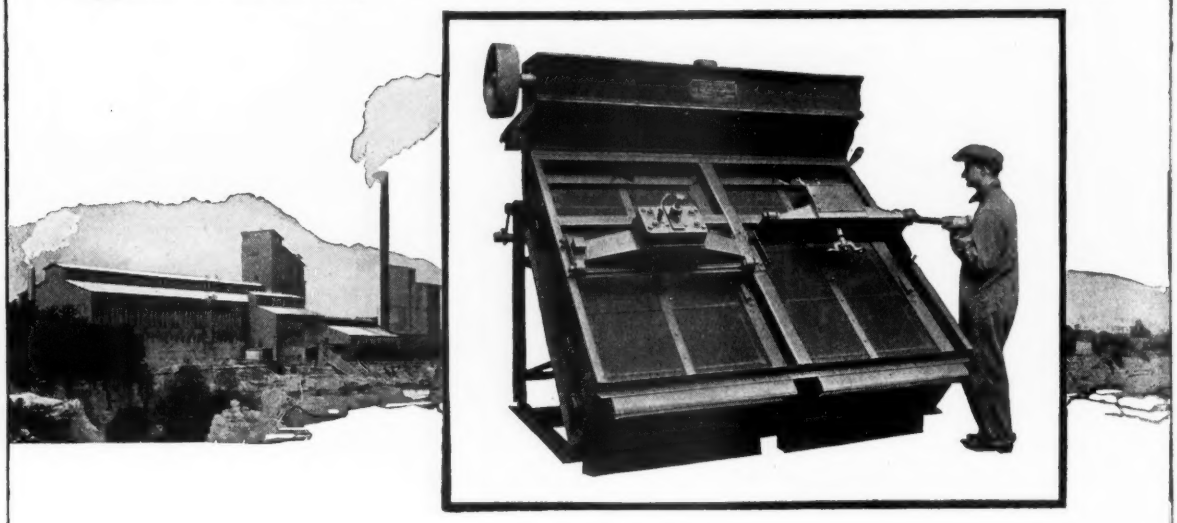
3188 Locust St., Milwaukee, Wis.

Old Colony Bldg., Chicago, Ill. 710 Witherspoon Bldg., Philadelphia 930 Oliver Bldg., Boston, Mass. 2540 University Ave., St. Paul, Minn. Franklin & Channing Aves., St. Louis, Mo. Road Bldrs. Eq. Co. Portland, Ore. Watson, Jack & Co., Montreal, P. Q.
50 Church St., New York City 110 W. Park Way, N. S. Pittsburgh, Pa. 6110 Euclid Ave., Cleveland, O. 325 W. Main St., Louisville, Ky. Salt Lake Hardware Co., Salt Lake, Utah. 625 Market St., San Francisco Kelly-Powell, Ltd., Winnipeg, Man.

When writing advertisers please mention ROCK PRODUCTS

HUM-MER INCLINED SCREEN

Applies Electro-Magnetic Vibration to a "Drumhead" Tension Screen



A FEW PROMINENT USERS OF *HUM-MER* SCREENS

Bethlehem Steel Co.
Pittsburgh Plate Glass Co.
Arizona Copper Co., Ltd.
Ottawa Silica Co
Morris Fertilizer Co.
Goodyear Tire & Rubber Co.
American Smelting & Refining Co.
Continental Portland Cement Co.
Laclede-Christy Co.
The Norton Co.
Diamond Alkali Co.

"Makes wire cloth screen faster and wear longer"

Write for catalogue No. 42 R

TONNAGE OUTPUT INCREASED

ONE company has installed 17 HUM-MER Inclined Screens. The following data gives the comparative results obtained with the HUM-MERS. In this installation, the desired material is an intermediate product, both the coarse and fines being taken out so that the percent of product in the feed is low.

	Screen analysis of product	Tonnage per hour
Old Screen,	95.6% on 40 mesh,	1695 pounds
HUM-MER,	96% on 40 mesh,	4644 pounds

In this particular case a remarkable tonnage of 274% was obtained.

HUM-MER Inclined Screens have been supplied for screening a great variety of materials; both coarse and fine, in fact, the HUM-MERS in the field today have shown definitely that the HUM-MER will handle finer sizing than has ever been possible through a wire cloth screening surface, and this with profitable tonnage.

THE W. S. TYLER COMPANY, *Cleveland, Ohio.*

Manufacturers of Woven Wire Screens and Screening Equipment

Rock Products

Vol. XXIII Chicago, October 23, 1920 No. 22

Missouri Crushed Stone Producer Sells to Cement Manufacturer

Edward Hely Crushed Stone Co., Cape Girardeau, Not Much Worried by Car Shortage

AN EXAMPLE of the recognition that quarrying as an art in itself is the case of the Edward Hely Crushed Stone Co., and the portland cement company, whose property adjoins that of the stone company at Cape Girardeau, Mo. The cement company buys its crushed stone of the quarry company and this crushed stone is delivered to the cement plant either to its own stone bins or upon a large stock pile.

The cement manufacturer recognizes that quarrying is a job for a quarryman and that he is fortunate in being in close proximity to a very experienced quarryman. The arrangement is satisfactory all around because it assures the crushed-stone producer of a certain volume at a comparatively steady rate of consumption and thus reduces his quarry costs, while the cement manufacturer gets the advantage of the larger quarry operation that is possible where a large volume of commercial business is done.

Quarry Operation

The most interesting part of the crushed stone plant is the quarry, where a 110-ft. ledge of stone is being worked in three benches. As the views will show the stone deposit is an outcrop—that is a considerable portion of it lies above the surrounding ground level.

Two types of drills are in general use—the steam-operated well drill which is used on the upper ledges where the bench is larger and smaller compressed-air operated tripod drills are used on the lower benches.

Blasting is done with dynamite and electrical detonators. Holes are spotted according to the characteristics of the ledge and a series set off at one time. The best results have been obtained when two rows of holes are shot down at one time. The upper bench is about 55 ft. high, which at present has very nearly been worked to the property line. The second shelf, which is below the ordinary ground surface, is 30 ft., and the third is about 25 ft. deep. Narrow gauge tracks serve each level and mules are used to transport material to the crusher.

Most of the material is hand loaded. A steam shovel has been used and is at present on the lower level, but the abundance of labor has made hand loading preferable. The stone breaks up at the initial blasting in sizes which do not require very much second shooting.

General view of Edward Hely Crushed Stone Co. Quarry, Cape Girardeau, Mo.

Crushing Plant

The initial crusher, which is a No. 12 gyratory, is mounted in the quarry 40 ft. below the normal ground level. It is driven by a rope drive from the main line shaft in the secondary crusher plant. Rock is delivered to the crusher from three track levels. Stone excavated above the ground level is delivered in end dump cars and a special device is used to empty the cars.

The car of quarry stone is rolled onto a special car tipple which holds the end gate with extending bars while the car is dumped into the crusher by a pivoted section of track. The cars on the second and third levels are also end dump and are pulled up inclines to the crusher, where they are emptied by the standard arrangement for this type of car.

The crushed product is elevated to the crushing plant screens by a pan elevator, 106 ft. high, and the 1¼ and 2½-in. sizes are removed. The 1¼-in. stone is primarily for the use of the cement plant but may be chuted to the stone plant's bins.

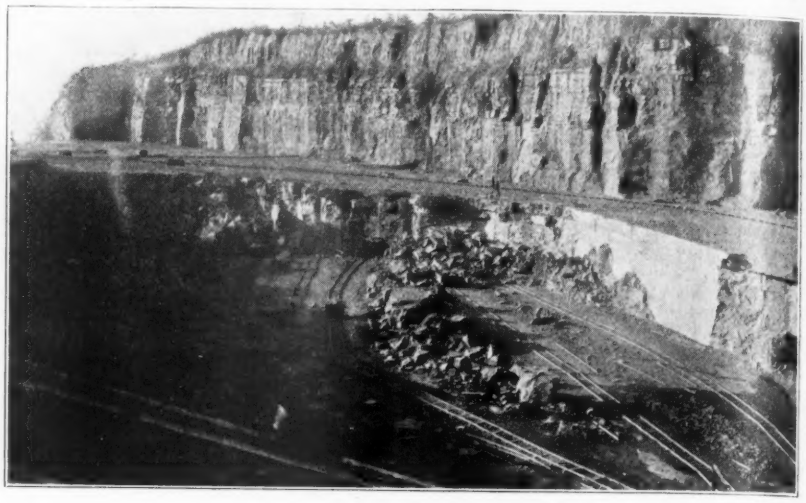
In event that it is to be used for the cement plant it is delivered to its property by a long housed-in belt conveyor. A 500-ton storage bin and ground storage are provided for receiving the stone. The haul from the rock storage to the cement plant is made by the cement company's own standard gauge cars and locomotives, the rock being loaded from ground storage to cars by a 30-ton locomotive crane and clam-shell bucket.

The rejections of the scalping screen are rechuted to a No. 8 gyratory crusher. The product of this crusher is also elevated to a similar screen where the same sizes are removed and rejections go to a No. 6 crusher. A third jacketed screen separates smaller sizes and also the agricultural limestone. Final crushing is done by a roll crusher, which delivers the material to the same elevator that serves the No. 6 crusher.

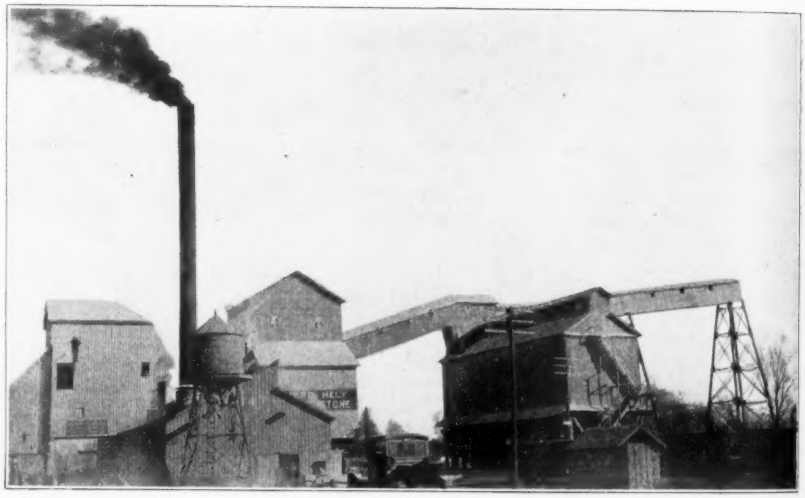
The fines of the first two screens also are chuted to the third screen to remove the dust. The No. 6 gyratory and the roll crushers may be used for further reduction of any size not needed. Six storage bins are provided so that commercial stone may be directly loaded into cars for shipment.

The plant makes its own power with one 400-h.p. O'Brien water-tube boiler which supplies an air compressor, a 250-h.p. Westinghouse vertical compound engine, and a steam pump in the quarry.

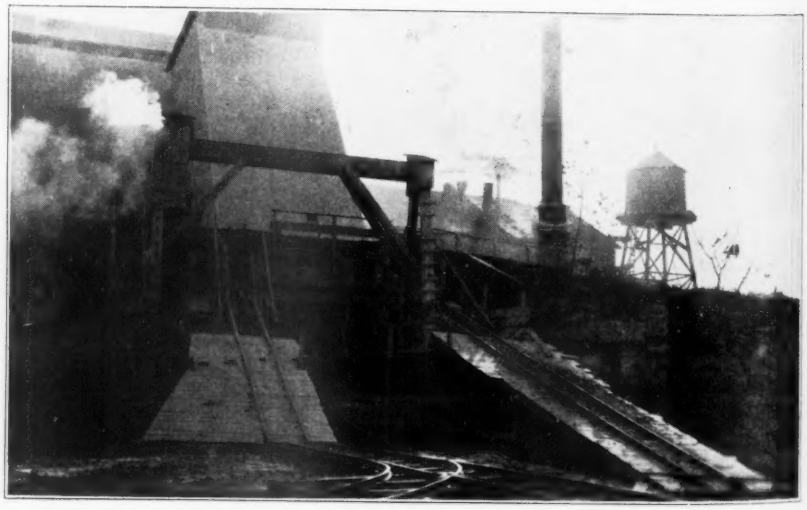
The crushers and elevator drives are so arranged as to permit a shaft drive of the whole plant as a unit. Owing to the considerable distance of the lowest level of the quarry from the boiler room some of the quarry drainage pumps are operated by air. In this instance it is considered better economy to use compressed air than to have such a long exposed steam line. The plant is owned and the operation is supervised by Edward Hely.



View shows three benches in quarry



Plant of Edward Hely Crushed Stone Co.



Special car tipple and incline to crusher house

Los Angeles' Remarkable Gravel and Boulder Deposits

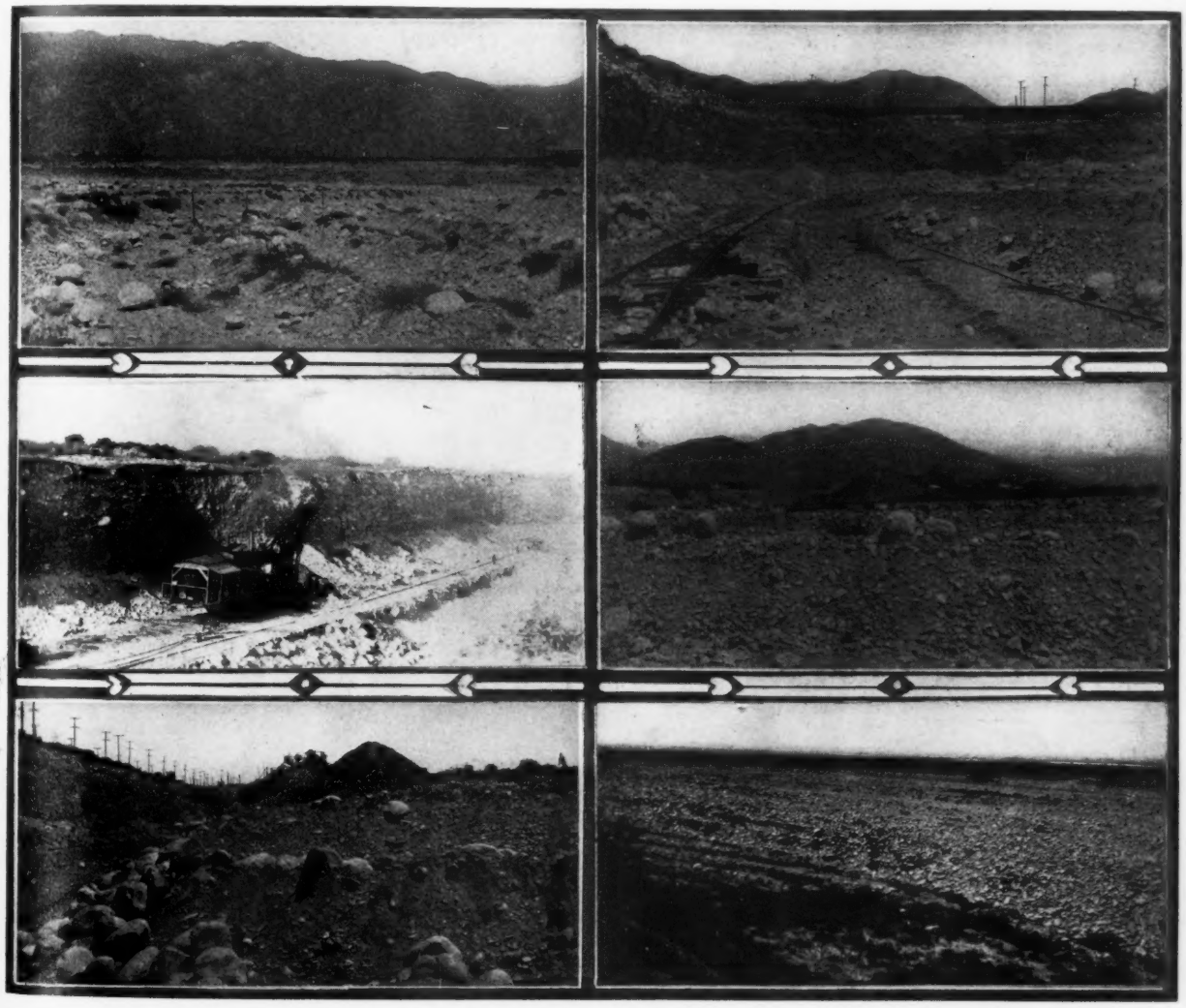
Crushed Rock Principal Output of Plants at Azusa and Kincaid, About 25 Miles East of the California Metropolis—Gravity Operation of Plant Railways

LUCKY IS THE CITY situated at the foothills of high mountains—so far as a supply of mineral aggregates is concerned, at least. Mountain streams are almost invariably contributors to sand and gravel deposits and the plains and foothills surrounding the mountains usually are composed largely of sand and gravel.

Los Angeles, Calif., is particularly well supplied with sand and gravel. East of the city, crossed by all eastbound railways is possibly the most wonderful deposit of gravel to be found in this country—this means gravel and not sand and gravel, because as a matter of fact the deposit contains only a small proportion of sand.

There issues from the mountains near Azusa the bed of what was once an immense glacier, which brought down from the mountains millions of tons of gravel and boulders, to be deposited at the doorstep of what is now the largest city on the Pacific coast. This glacial deposit is now mined for its treasure of gravel at various points, starting at Azusa and following the course of the glacial drift to the southward.

These plants are owned and operated by the Pacific Rock and Gravel Co., a subsidiary of the Union Rock Co. of Los Angeles. (Note that the title of the company is "rock and gravel" and not "sand and gravel," as the term usually is in the East.) And "rock and gravel"



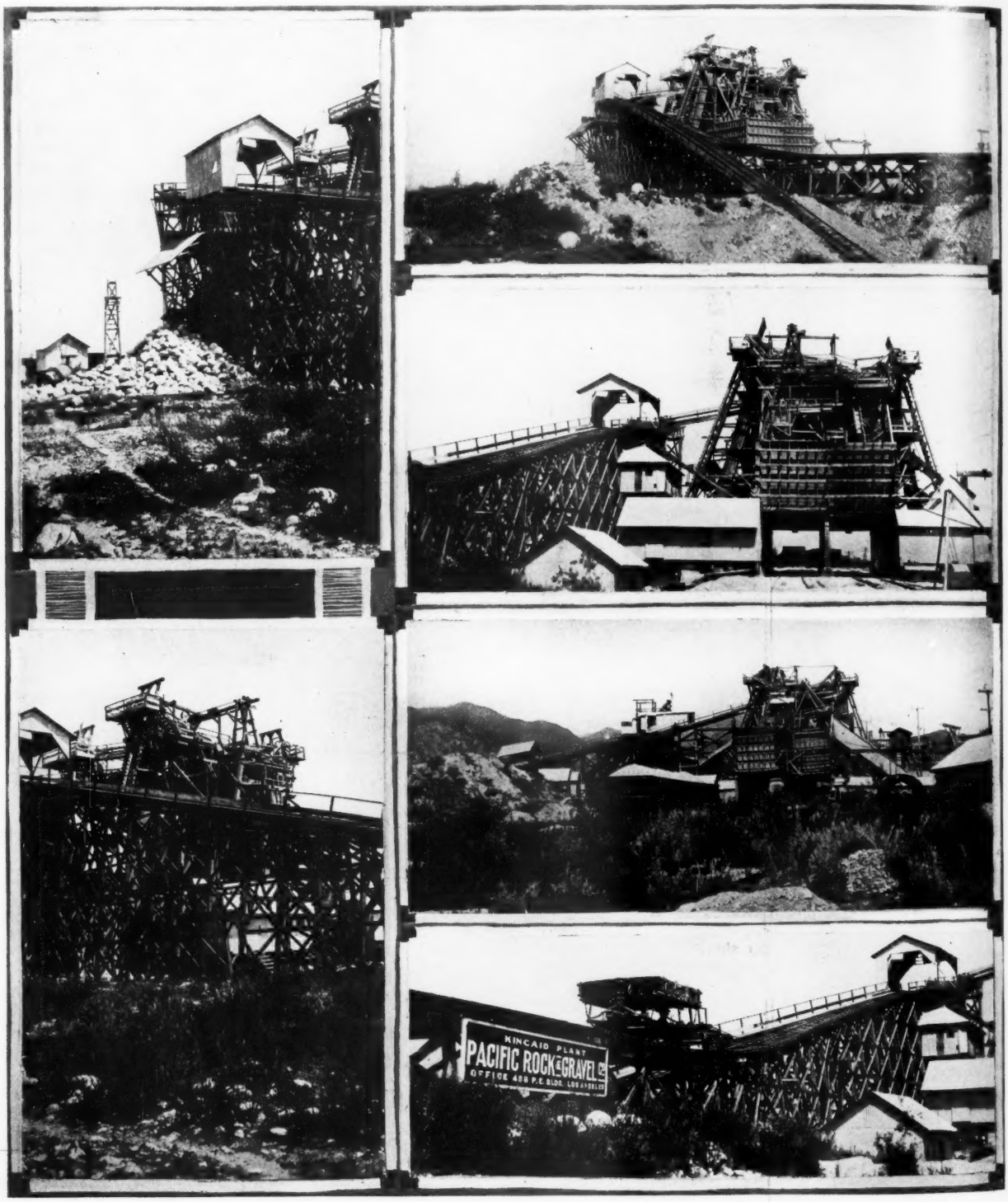
Various views of the gravel pit of the Pacific Rock and Gravel Co. at Azusa, near Los Angeles, Calif.

describes this product more accurately than sand and gravel.

Unique Gravity Railways

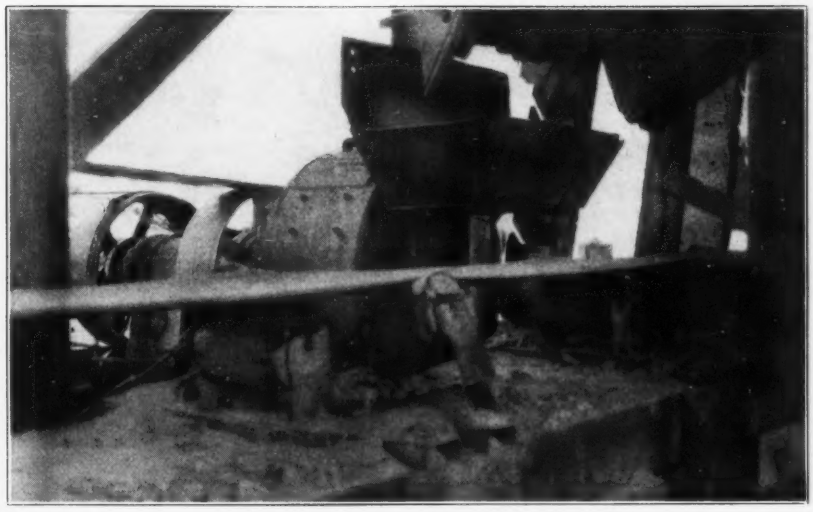
The most interesting feature of these operations to both quarry and gravel plant operators is the unique and ingenious method of operating the transportation systems. This method is apparently adaptable to any pit operation—quarry or gravel—but of course would be harder to carry out in a quarry.

The pit at Azusa is nearly round. The crushing and screening plant is erected at the highest point on the rim of the excavation. In general, as will be described farther on, it is the usual type with an elevated crusher and screening

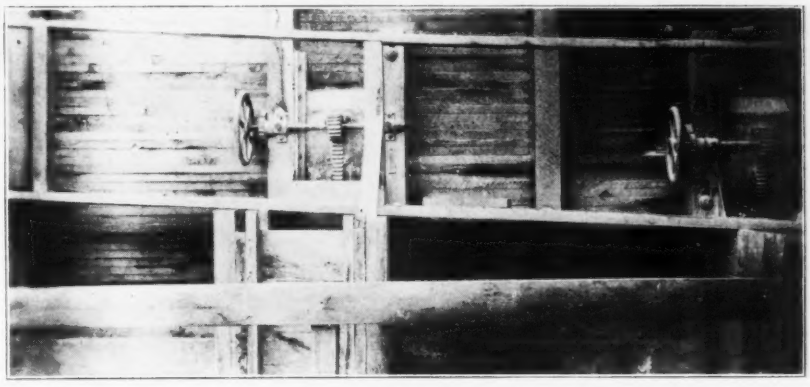


Views of the Azusa and Kincaid plants of the Pacific Rock and Gravel Co. of Los Angeles—really two separate plants in one in each case. One unit is a typical rock-crushing and screening plant, while the other unit is a typical washing and screening plant. The material is separated at the beginning of the operation and each goes to its own part of the plant

Initial crusher at the Azusa plant



Disk crusher for crushing screen rejections



Type of bin gate used. These gates feed a belt conveyor providing for a mixture of sizes

tower. The cars are drawn up an incline to the initial crusher and grizzly, exactly as at many quarry plants.

The hoist for pulling the cars up the incline is the only power required to operate the entire transportation system. For as soon as the cars are dumped they are released from the dolly car used to haul them up the incline, and they roll back all the way by gravity to their places in the pit opposite the shovel, where they are loaded. From this point the loaded cars roll by gravity to the foot of the incline, where the dolly car picks them up again.

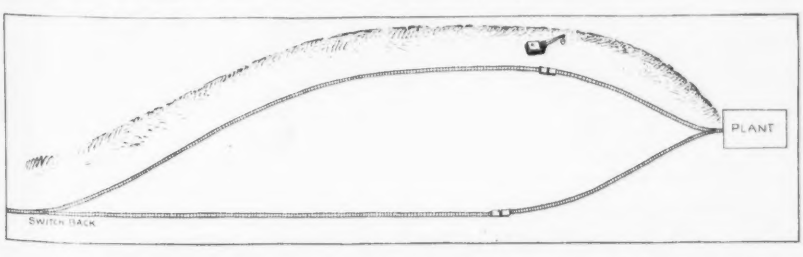
The cars are usually handled in pairs and every car is provided with a foot brake, by which its speed is controlled. One man rides two cars and thus replaces the locomotive and higher paid engineer usually necessary in similar operations. The man of course rides the rear car on the rear platform to avoid danger should he fall off.

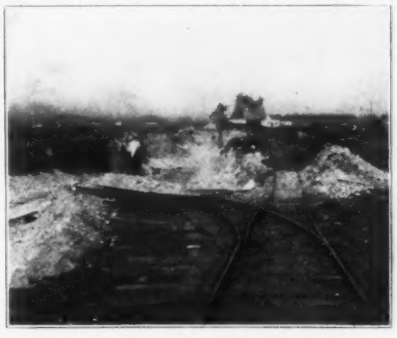
The Azusa pit, as has been stated, is nearly round so that the cars travel in a circuit, after taking the switch on the incline below the crusher. But this kind of pit operation is not necessary to the gravity method of car operation as is shown at the nearby plant at Kincaid. The pit operation here is a long straight cut, but the cars are returned to the shovel and later to the foot of the incline by the same method, using two straight tracks and a switchback instead of a closed circuit.

The Kincaid method is obviously more dangerous than the other because for a part of the trip the car rider will be at the front of the cars and liable to serious injury should he fall. Also there is danger of going over the end of the switchback, an accident that had actually happened shortly before the editor's visit.

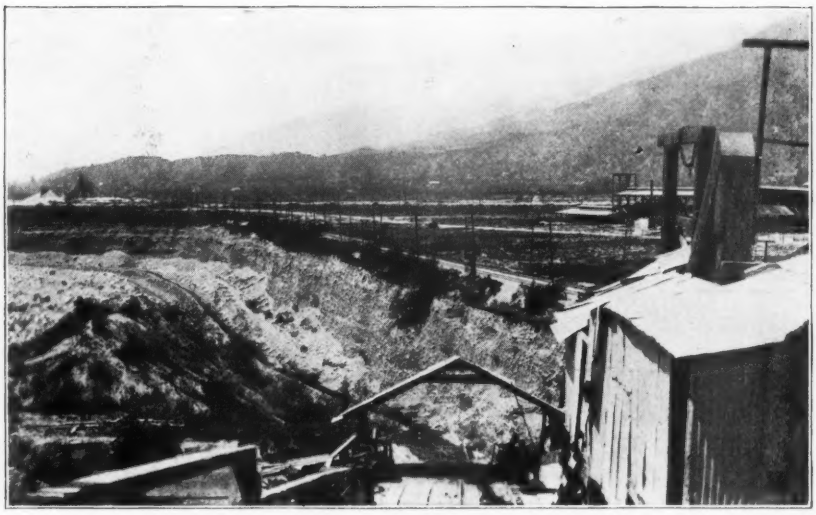
The details of this method of pit operation are shown in the accompanying views and sketches. Instead of the shovel working continuously at the maximum depth of the pit, it starts in at the point farthest from the foot of the incline with no cut at all and then gradually works down grade, constantly increasing the depth of the cut.

The loading track has a corresponding



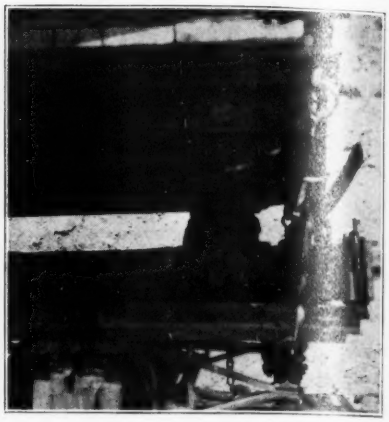


Track layout at the Kincaid plant showing operation of a gravity railway with one long nearly straight cut

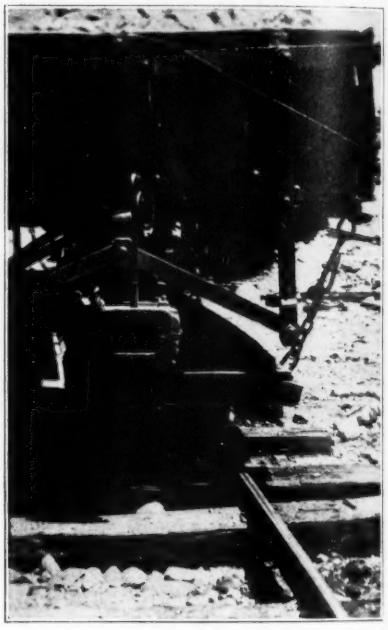


Looking into the Azusa pit from the top of the car incline

Seven-yard side dump car attached to dolly for hauling up the incline

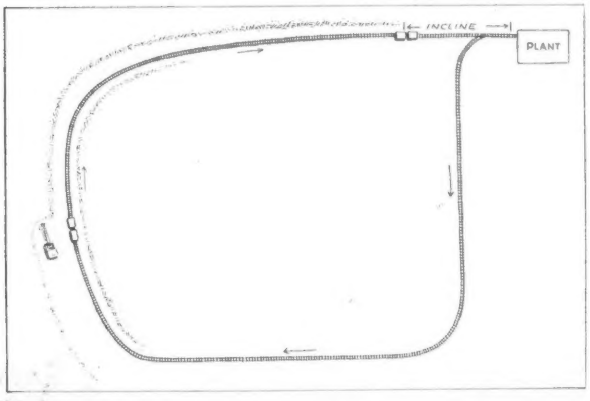


Foot brake on every car



Another view of foot brake

down grade of 2 or 3 per cent, so that the cars will start and move readily by force of gravity. It is obvious that it is not altogether an economical operation, as a part of the time the shovel will be working in too shallow a cut for the best economy, and also in the second cut or circuit of the bank, when the shovel is



Approximate layout of the Azusa pit showing track arrangement for gravity operated railway. Arrows show direction of slope. Cars run by gravity from top of incline to location of the two cars shown

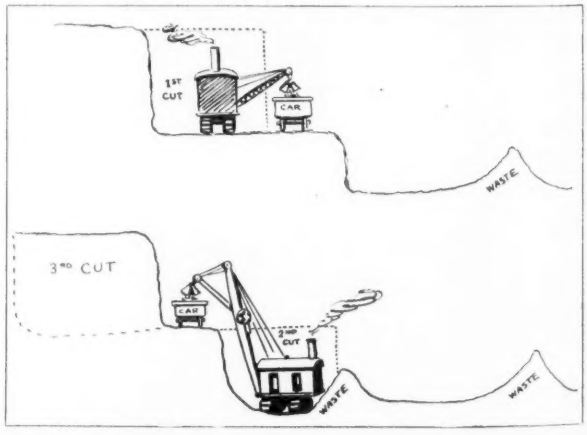


Diagram to illustrate method of pit operation. After the first cut the track is shifted to the inside of the cut and the shovel works from below

working on the inside of the track circuit, it is compelled to leave a windrow of material, which in the aggregate amounts to a considerable yardage.

In this particular case the material is so plentiful that what is left in the pit causes no worry. The pits are worked royalty basis, so that the area to be worked is, in a measure, limitless. The scheme of course requires a little engineering and the fairly accurate establishment of the proper grades for the track.

Crushing and Screening Plants

Each crushing and screening plant really consists of two distinct units—a dry, rock-crushing and screening unit, and a wet, washing and screening unit. The material is dumped on to a grizzly where the boulders are fed to a primary breaker (at Azusa this is a No. 9 gyratory) while the sand and small gravel is at once separated out and conveyed by a belt conveyor to the washing plant.

The crushed stone first goes through a scalping screen, with a pair of smaller gyratory recrushers, for the rejections, and then to a dry screening plant, where the rejections are handled separately by a disk crusher and elevator back to the jacketed sizing screen, as in a standard crushed-stone plant.

The sand and gravel are elevated to a washing and sizing screen and are handled much as in any sand and gravel plant, except of course that the sand is the least important product made.

The Union Rock Co., with offices in Los Angeles, operates several such plants.

Washington Plant of the Lehigh Company Resumes Operation

Lehigh Portland Cement Co. Completes Flume Construction at Cost of Over $125,000

AT A COST OF OVER $125,000 the Lehigh Portland Cement Co., of Metaline Falls, Wash., has placed in service the new flume which has been in construction since last April.

The company started operations at Metaline Falls nine years ago. To deliver water from its reservoir on Sullivan Lake there was constructed a flume 2½ miles long. This flume, resting on slight foundations, was subject to slides and breakdowns, resulting in frequent interruptions of power. During the last year the condition of the flume became such that the construction of a new one was imperative. The company's sawmill at Sullivan Lake was started on the sawing out of timbers and crews put at work to get out the cedar piling on which the new flume was to rest.

In April of this year the work of constructing the new flume was begun and of necessity the operations on the cement plant, dependent on the flume for power, were discontinued.

A million and a half feet of lumber was used in the construction of the flume and 85,000 feet of piling. The old flume rested on blocks along the side of the canyon but every foot of the new flume is supported by piling, some of which it was necessary to drive as much as 15 feet to secure a solid foundation.

The size of the flume box is 5 ft. by 6 ft. The bottom and sides are all matched grooved boards, and the connections are further tightened by caulking with pitch and oakum to prevent waste of water and lengthen the life of the flume. In the laying out of the flume many sharp curves of the old flume were eliminated and the length of the flume was cut to 2⅓ miles.

The flume will carry 70 cubic ft. of water per second and the velocity of the water in the box is 3½ lineal ft. per second. From the head gate of the flume to the penstock there is a drop in elevation of 11¼ ft. From the penstock to the power house there is a drop of 460 ft. The water is conveyed from the penstock in a steel pipe line 36 in. in dia. through a tunnel 580 ft. long. As the water enters the water wheels it is reduced from 36 in. to a flow of 3½ in. and with a pressure of 200 pounds to the square in.

The power plant has two Pelton water wheels with a rated capacity of 4,000 h.p. The cement plant in full operation consumes approximately 1,800 h.p.

The designing and engineering work on the new flume, and also supervision of construction, were under the direction of H. C. Helwig, superintendent of the plant, and A. R. DeHuff, resident engineer. Every effort was made to speed up construction and the company has paid a bonus of $10 to every man on the job.

The Lehigh Company has been subjected to some criticism for shutting down its plant and constructing its new flume at a time when cement shortage existed all over the country, but even a casual investigation of the old flume showed the absolute necessity of the shutdown. The company could have sold every pound of the product it could manufacture during the period and besides the loss of business has had to make a large outlay for the new flume.

In constructing the flume a number of interesting problems were met and solved by Messrs. Helwig and DeHuff. All the timber and piling were cut at the Sullivan lake mill and in order to get the material along the flume right of way it was necessary to devise an unusual method of transporting the lumber. Mr. Helwig conceived the idea of transporting the lumber by motorcycle power, using the completed portions of the flume as the track. The flume line follows the Sullivan creek canyon and no road was available. Mr. Helwig secured a motorcycle, had it fitted with a side wheel, and the machine hauls a two-wheeled truck with 800 ft. of lumber per load. Mr. Helwig's scheme was found practical and has aided very much in speeding up the work of construction.

Officials of the cement plant look forward to a steady run that will help to relieve the material shortage that exists in the country. The company recently purchased the Washington hotel property at Metaline Falls to help provide quarters for the full crew that will be employed with the resuming of operations.

Freight Rates on Cement

IN A REPORT on No. 10963, Kosmos Portland Cement Co. vs. Akron, Canton & Youngstown et al., opinion No. 6376, 59 I. C. C. 1-5, Chairman Clark said the rates on cement from Kosmosdale, Ky., to destinations in southwestern Ohio, not including Cincinnati, were not unreasonable or unduly prejudicial. The effect of the holding and the consequent dismissal is to leave undisturbed the present relationship of rates on cement as between plants north of the Ohio and south of that stream, the Kosmos plant being near Louisville and competing plants at Speeds and Mitchell, Ind., and Buffington, Ind., 22 miles southeast of Chicago, Ill.

Cement Imports and Exports During August

FIGURES showing our imports and exports of cement during the month of August have just been secured by the Washington Bureau of Rock Products from the Department of Commerce, Washington, D. C.

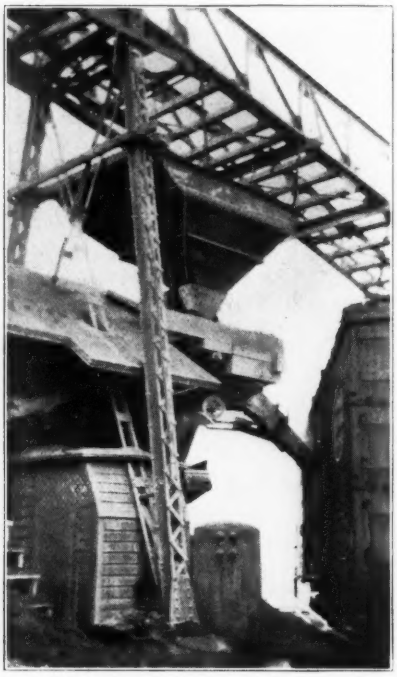
Imports during the month amounted to 20,874,200 lbs., valued at $162,315. Exports aggregated 174,567 bbls., valued at $598,252. Our largest markets for cement were Brazil and Cuba.

Hints and Helps for Superintendents

Box-Car Loader

THE TWO VIEWS SHOWN illustrate a type of car loader found in the Mt. Pleasant district phosphate fields. The one type is used to load the fine material which is weighed in the hopper before going to the car. The second type is practically the same as the other except that it is used to load the rock phosphate. In this case the car rests on a standard track scale and the material is weighed as loaded.

The material is delivered to the hopper which feeds the material onto the car loader. The car loader is pushed into the box car and carries the phosphate to the ends of the car.



Phosphate-rock box-car loader

Limestone Wagon Bins

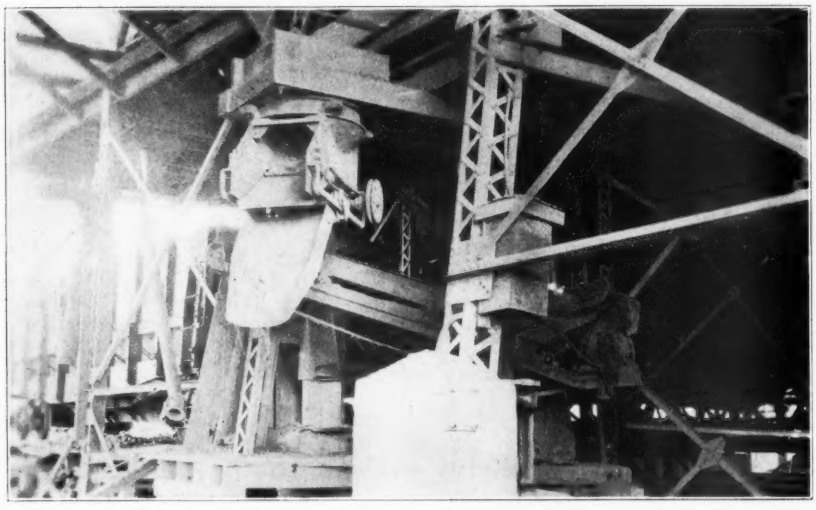
ALMOST ALL agricultural limestone grinding plants have some wagon trade from farmers in the vicinity of the plant. Very few plants make any special provision for this trade.

This kind of trade ought to be cultivated because it is often educational for the farmer to visit a legitimate commercial plant and see for himself that the production of the stuff is a real manufacturing operation. It raises the value of "agstone" in his estimation. Therefore it is good publicity.

Moreover, if proper provisions are made, it saves time and labor on the part of the plant's employees for the farmer to come and haul away his own material. As the use of motor trucks on the farm increases, this feature of the agstone business should increase proportionately.

The view herewith shows how the Bessemer Limestone and Cement Co., Bessemer, Penn., takes care of this kind of trade. A covered belt conveyor is constructed from the limestone car-loading and bagging-machine bins, so that material may be drawn from these bins and emptied into a separate wagon loading bin some distance away.

Farm-wagon loader for an agricultural limestone plant



Type of loader for larger sizes of rock

The wagon bin is so constructed that the farmer can readily drive under it, on to a platform scales, where his wagon is weighed. Then by means of a hooded spout, to prevent unnecessary dust, any amount of limestone the farmer wants or his wagon will hold, can be loaded in a few seconds.

The material loaded from this bin is finely ground material, about 90 per cent through 100-mesh, and no inconvenience is experienced in handling it in bulk. It will pack so solidly in a short wagon or truck journey that the farmer can readily shovel it out.

Cement-Slurry Kiln-Feed Indicator

THE PLANT of the Southwestern Portland Cement Co., Victorville, Cal., has an ingenious device to keep the kiln foreman informed of the amount of slurry being fed to the kiln, as well as to warn him of any interruption to the feed.

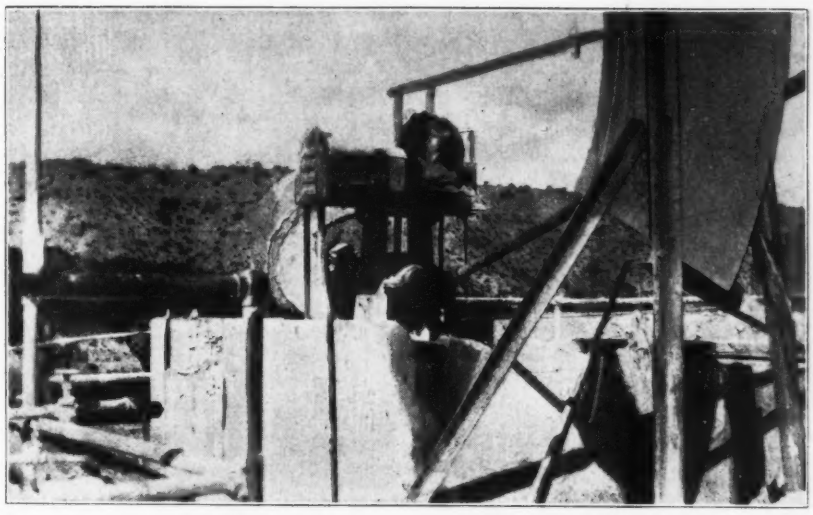
The device used to feed a uniform amount of slurry is an S-shaped scoop which revolves slowly, dipping each half revolution into a concrete trough of slurry.

The level of the slurry in the trough is kept at a constant level by an overflow weir, which returns the excess of slurry to the slurry tanks, whence it is re-pumped to the feeding trough.

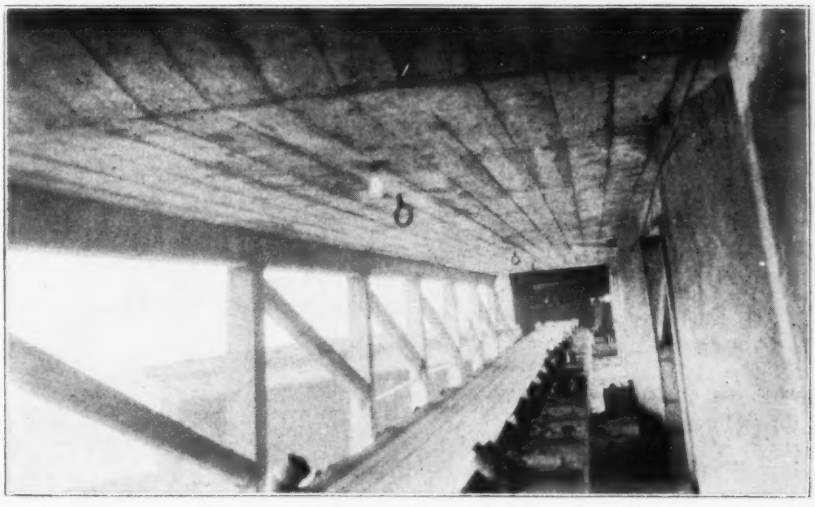
The scoop wheel discharges through the hollow axis to a concrete trough which feeds the kiln. The scoop wheel of course serves the double purpose of keeping the feed uniform and the slurry agitated.

The level of the slurry in the overflow trough is indicated by means of a float connected with a pointer and a large segmental dial, which can be easily read from the far end of the kiln. This makes it possible for the kiln foreman to readily adjust the feed, without going to the tops of the slurry tanks, where the feeding device is. The view shown here is of the reverse side of the indicating dial. The kiln is 200 ft. long, so that a good sized dial is necessary. The movement of the float is of course magnified several times by the lever arm of the pointer.

This is only one of the many special features of the Victorville plant, which is the special pride of Carl Leonardt, president of the Southwestern company. P. S. Taylor is superintendent. Another kiln, slightly larger in size, has recently been installed to the right hand of the view shown herewith.



Device for indicating setting of slurry feeder



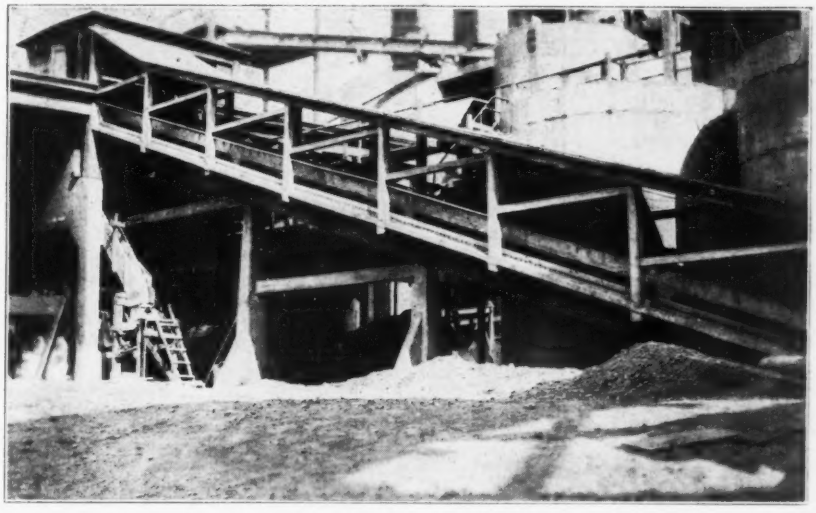
Concrete conveyor gallery of a cement plant

Concrete Conveyor Gallery

THE SUPERIOR PORTLAND CEMENT CO., Concrete, Wash., is reconstructing its plant entirely of reinforced concrete. The officers and directors of this company believe in demonstrating the slogan of the cement industry, "Concrete for Permanence." The plant is being entirely rebuilt without interference to operation.

The accompanying views show how concrete has been used even for the construction of a belt conveyor gallery. This belt carries the raw materials from the crusher house to the preliminary raw grinders.

The gallery is of the post and strut construction shown, with a thin slab roof and floor. A passageway is provided along one side of the conveyor. The conveyor rollers are mounted on timber ties bolted to the concrete.

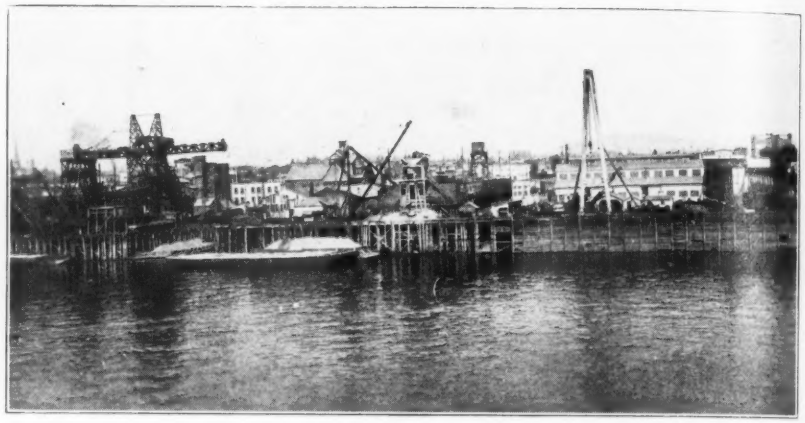


View showing method of construction of reinforced-concrete gallery

Mineral Aggregate Industry of Portland, Oregon

Crushed-Stone Plants on the River Banks, Sand from Columbia River and Gravel from the Willamette River

FEW CITIES are more fortunately situated as regards supplies of mineral aggregates—sand, gravel and crushed stone—than Portland, Ore. Columbia River sand, dredged in close proximity to the city, is an excellent material for concrete, mortar, plaster and for filler in asphalt pavements. It is found in these three grades or sizes in different deposits so that no screening or separation of the material on the dredge is ordinarily necessary. Gravel comes from the Willamette River, where a special type of washing and sizing plant has been developed. Crushed stone comes from crushing plants on the Columbia River some 20 to 30 miles below the city.



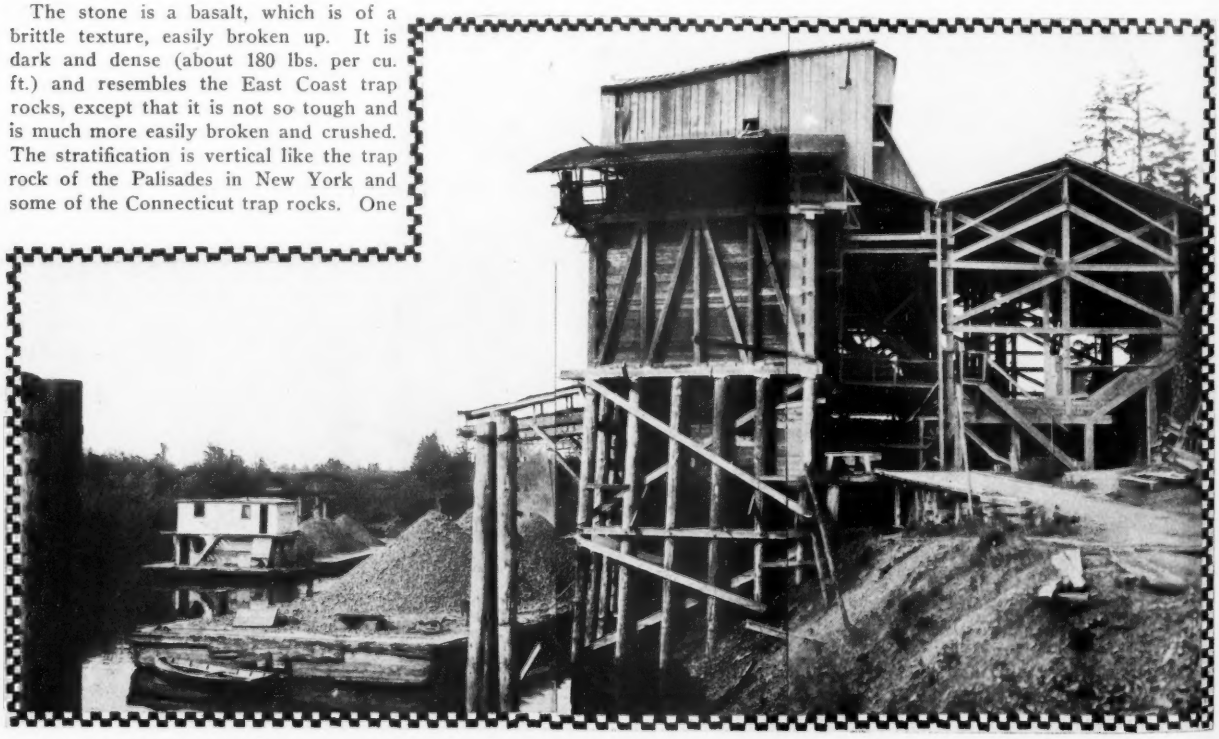
Water front of Portland, showing sand and gravel unloading plants

Quarries and Crushing Plants

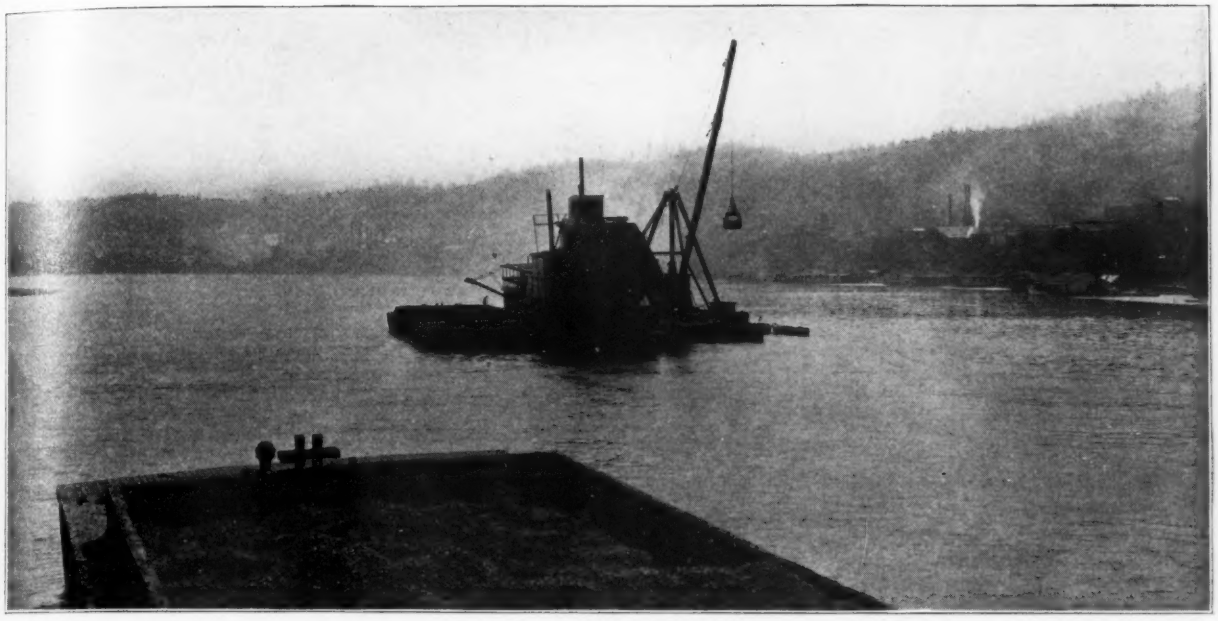
The Columbia Contracting Co. is one of the principal producers of both sand and crushed stone. Its quarry and crushing plant on the Columbia River at East Auburn about 30 miles below Portland is typical of these operations.

The stone is a basalt, which is of a brittle texture, easily broken up. It is dark and dense (about 180 lbs. per cu. ft.) and resembles the East Coast trap rocks, except that it is not so tough and is much more easily broken and crushed. The stratification is vertical like the trap rock of the Palisades in New York and some of the Connecticut trap rocks. One of the quarry views herewith gives a very good idea of its structure.

Because of its vertical stratification and the tendency to break up readily well drills have been tried and found impracticable for blast holing, owing to the sticking of the drill bits in the holes. The quarry face is from 30 to 40 ft. high and presents, under ordinary conditions, an ideal well-drill operation. Instead of



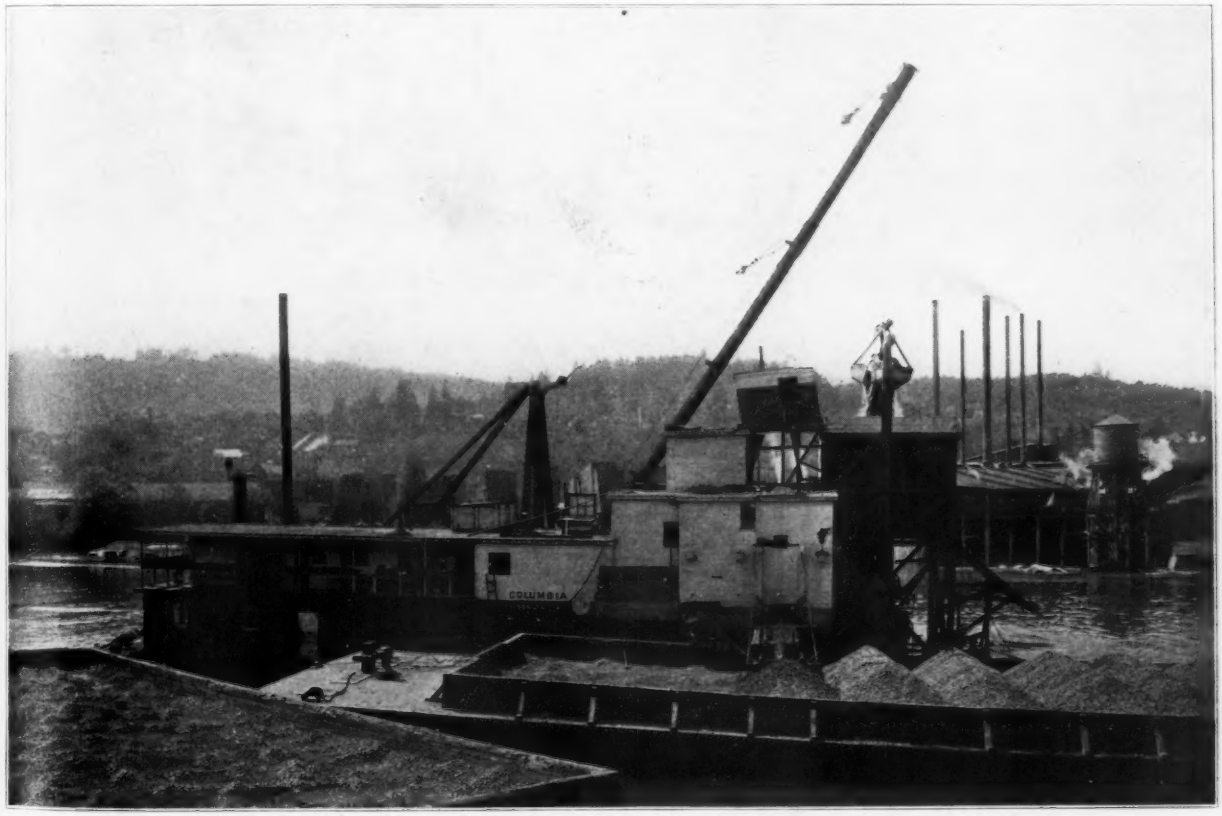
Auburn crushing plant of the Columbia Contracting Co., west of Portland, on the Columbia River



Common type of sand and gravel dredge operating on the Columbia and Willamette Rivers near the city of Portland—Derrick-operated clam-shell bucket excavators

this, however, the invariable practice is the use of "coyote" holes.

In this method small tunnels are driven into the quarry face at the level of the quarry floor. These extend in 20 or 30 ft., or more, and end in a tunnel of about the same length, or a cross-cut, driven at right angles to the main tunnel or entry. The tunnels are made only large enough for a man to work in. These are loaded generally with black powder, although some quarries use low grade dynamite,



Close-up view of one of the newer dredges of the Columbia Digger Co. showing living quarters provided for the crew. These dredges have no motive power and are towed from place to place

Auburn quarry of the Columbia Contracting Co., west of Portland

and from 100,000 to 200,000 tons of stone are shot down at a blast, with a very small expenditure of powder.

The stone is so thoroughly broken up in the blasting that it presents an ideal steam-shovel operation. Moderate sized, 30 to 70-ton, steam shovels are used, with 2½-yd. or smaller dippers.

The shovels load standard gauge cars of the contractor side-dump type. These are hauled up an incline and dumped into gyratory crushers of about 12 to 18-in. openings. At the plant of the Columbia Contracting Co. the crushers are of a smaller size than these, and are arranged in a row along side the track. The stone of larger size are dumped into the larger crusher and the smaller one is used for the smaller sizes of stone, thus distributing the load on the crushing plant.

The crushing plant is of the ordinary type except that it is erected on piles at the water's edge and is designed to discharge its bins on to flat-deck barges instead of into railway cars. This plant is not located on the river proper but on a bayou or inlet, through which a channel has been dredged to the river.

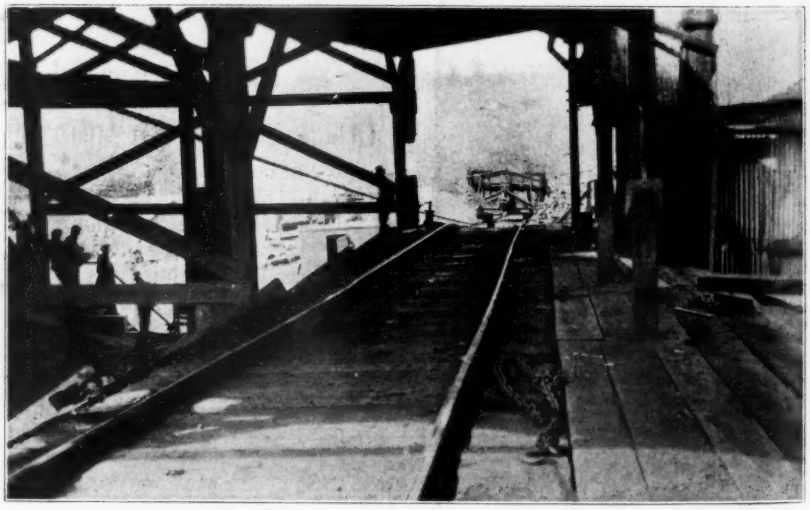
Another large crushed stone producer, which has a plant on the opposite side of the river about 50 miles from Portland is the Star Sand Co. This plant is similarly built on piles at the water's edge, but also is provided with railway connection.

This quarry is known as the Mt. Coffin quarry, the name being derived from the fact that in the days before our hardy forefathers blazed their way into this part of the world, the Indians were accustomed to use this small rock mountain as the last resting place for their dead. The custom was to lay the bodies on the high rock overlooking that broad river which the white men came in later days to call the Columbia.

At this plant the rock is dumped into one No. 7½ and two No. 5 gyratory crushers, from which it is elevated by a pair of revolving screens. Here it is separated into three sizes and fed into the bins which have a capacity of about 800 cu. yds. of crushed material each. From the bins the rock is dumped directly into scows as mentioned before, and towed to the company's Portland docks.

The president of the Star Sand Co. is C. Misinger, who founded the former Star Sand Co. of Pittsburgh, Penn., now the Iron City Sand Co. As its name implies the Star Sand Co. is also one of the principal river sand producers of Portland.

Character of the basalt or trap rock showing a "coyote hole" in the progress of preparation



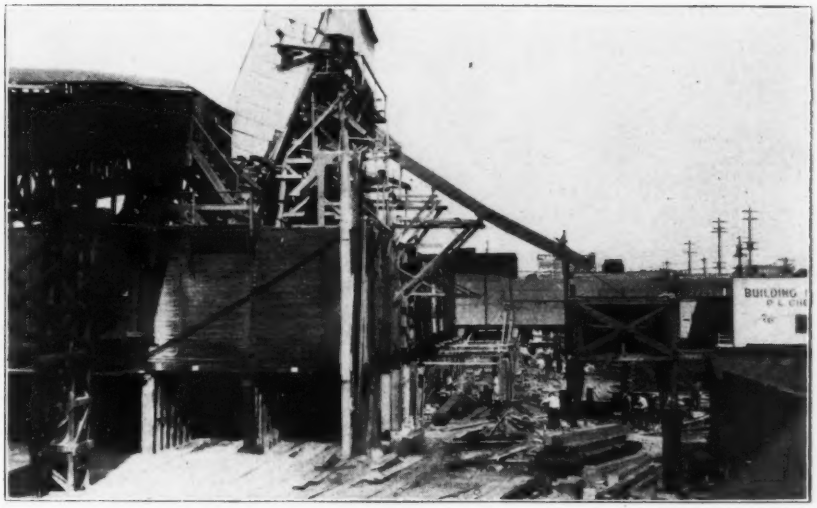
Crushing plant showing crushers on the left and incline from quarry in the center

Sand from the Columbia

The typical Columbia River sand dredger is very simple in construction and operation. The accompanying views show one of these dredgers owned by the Columbia Digger Co. They consist merely of square end barges with a long-boom derrick. The derrick is equipped with a clam-shell bucket, which dumps into a V-bottom hopper. The sand is passed through a rotary screen with ⅛-in. perforations, with a stream of water played over it, to wash the material. The waste goes overboard and the sand is chuted to scows alongside.

The dredge boats have no power and are towed from place to place. They are provided with living quarters for the crew of five men. They have a capacity of about 1000 cu. yd. per 10-hr. day.

These boats operate most anywhere in the river, but the operators are compelled to pay the state authorities a royalty of 10 cents per cu. yd. for all the sand dredged. The Columbia Contracting Co. operates one suction dredge, which is the only dredge of this type in the Portland district.

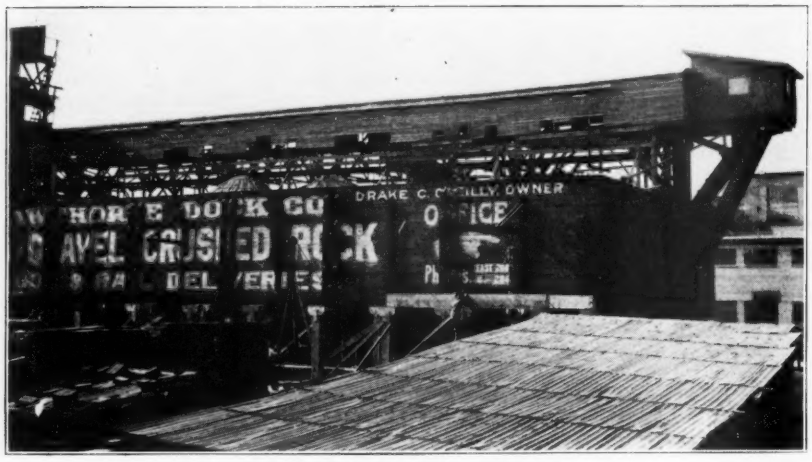


Typical Portland city sand and gravel bunkers

Gravel from Willamette River

Most of the Portland sand producers

Floating sand and gravel washing and screening plant for operation on the Willamette River—Latest type developed by the Columbia Digger Co.



Another view of Portland city bunkers

also operate gravel dredges in the Willamette River. The newest of these is that of the Columbia Digger Co. illustrated herewith. It is not a complete dredging unit, but more properly a floating gravel screening and washing plant. It is provided with a hopper which is fed by a dredge of the type used on the Columbia River, already described.

From the hopper a pair of multiple-jacketed rotary screens are fed. These are short stubby screens placed so that their discharge ends face each other. They are also fed from these ends by a pipe or flume which carries the material to the far ends of the screens. The screens are separately driven by short shafts from their solid ends.

The screens are slightly conical so as to give the necessary slope to discharge the material. The materials passing and retained on the various jackets are caught in separate steel hopper compartments, as shown in one of the views, and chuted to their respective loading spouts. The screens present about as compact an arrangement as it is possible to attain. They are 108 in. in largest diameter and 6 ft. long.

The screen rejections are taken by a belt conveyor to a hopper feeding a 42-in. Symonds disk crusher. The accompanying view shows two small jaw crushers, but these were subsequently replaced with the disk crusher, which serves the purpose to better advantage in this instance.

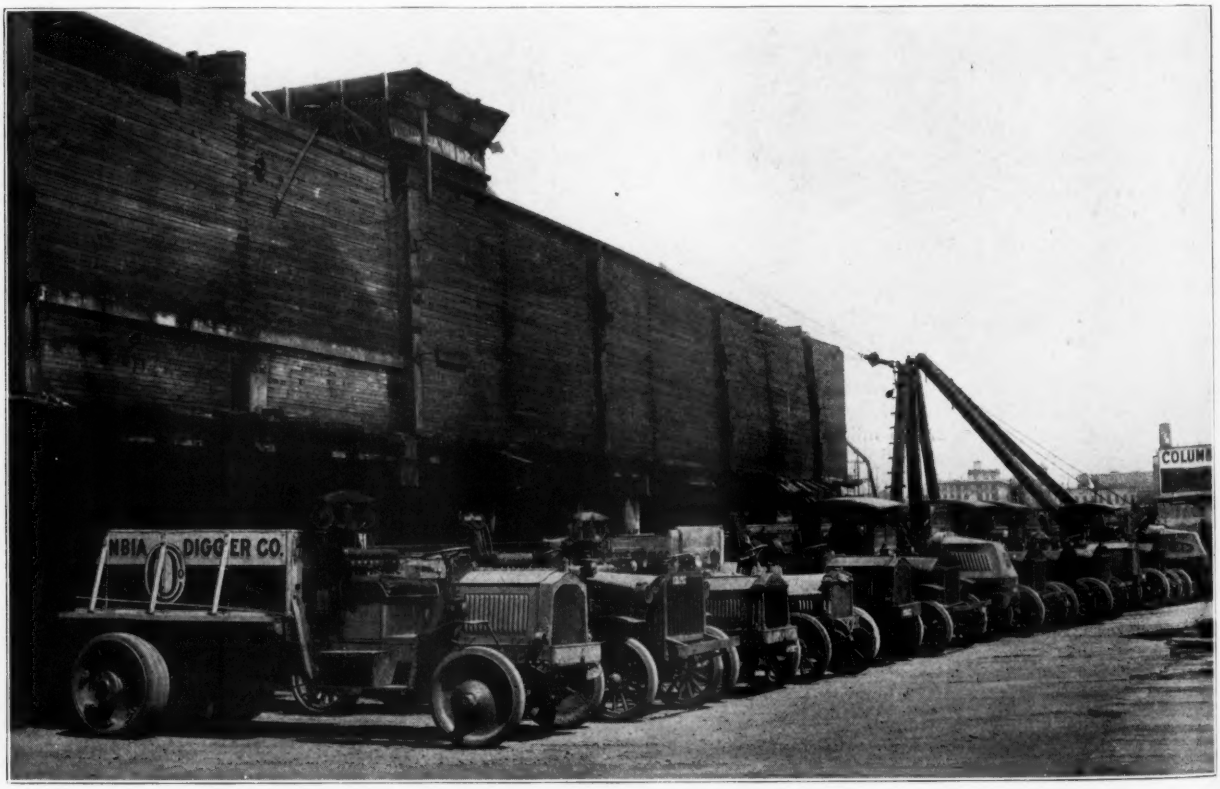
The output of the crusher is returned by a continuous chain-bucket elevator, which takes the crushed gravel back to the initial receiving hopper, where the operation is repeated.

City Distribution

Crushed stone, sand and gravel are all brought in deck-load barges to the city waterfront, where the most common unloading device is the revolving derrick and clam-shell bucket. These clam-shells are generally used to load hoppers, which feed belt conveyors extending over the tops of the bins or bunkers.

These bins are chiefly of the timber crib construction, and of both the side-loading and bottom loading types. Most of the business is motor truck, but all these river front bins are provided with railway connections and shipments are made to the surrounding territory by rail.

One of the views shows the fleet of motor trucks owned and operated by the Columbia Digger Co. It can be seen that the company has given all makes



Fleet of motor trucks for city deliveries owned and operated by the Columbia Digger Co., Portland, Ore.

of truck a trial and that both 3½ and 5-ton trucks are popular. There appears to be no preference as to size, each having a distinctive place in the city delivery system.

Besides the three companies already mentioned there are the Nickum & Kelley Sand and Gravel Co. and the Hawthorne Dock Co., all owning extensive waterfront properties and operating sand, gravel or crushed stone, plants and generally all three varieties.

Boost Indiana Sand and Gravel Industry

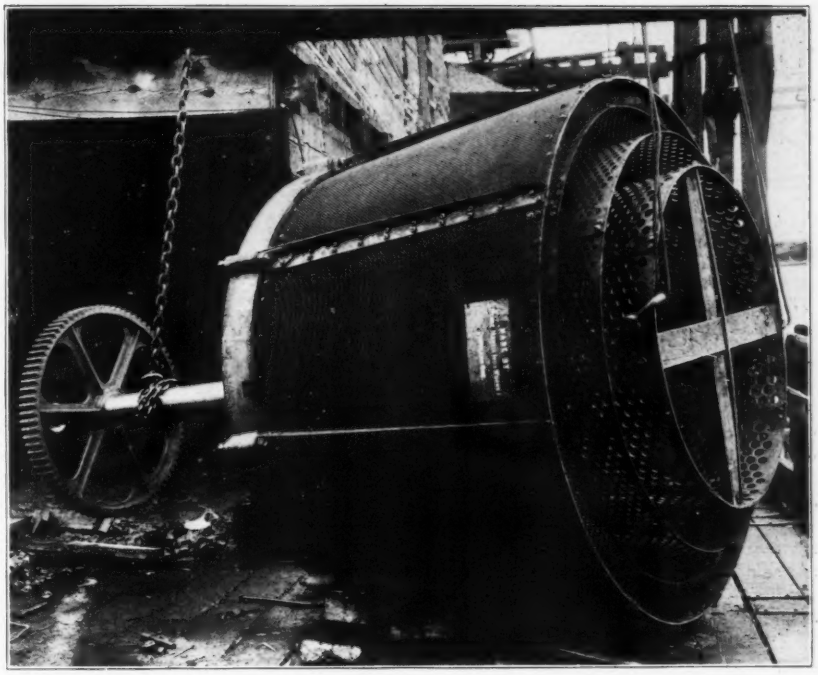
THE SAND AND GRAVEL industry was given a boost in a recent number of the monthly publication issued by the Terre Haute Chamber of Commerce. The article goes into the rise of the industry through a desire for better and stronger building materials. "Exclusive of ballast for railways," the article states, "Terre Haute ships 300,000 tons of sand and gravel a year. Washed, screened and sized materials are shipped all over the United States. The Geological Survey reports that the Wabash Valley has deposits of gravel two to three miles in width and 150 feet deep. These figures are especially applicable to the valley at Terre Haute. Up to the present time, the gravel has been excavated but large amounts could be taken from the river although to shells and other debris, the latter would be of an inferior quality. There are four plants engaged in this business in Terre Haute, the Wabash Sand and Gravel Co., the Western Indiana Gravel Co., the Maxville Gravel Co., and the Summit Sand and Gravel Co.

Road Building Progressing

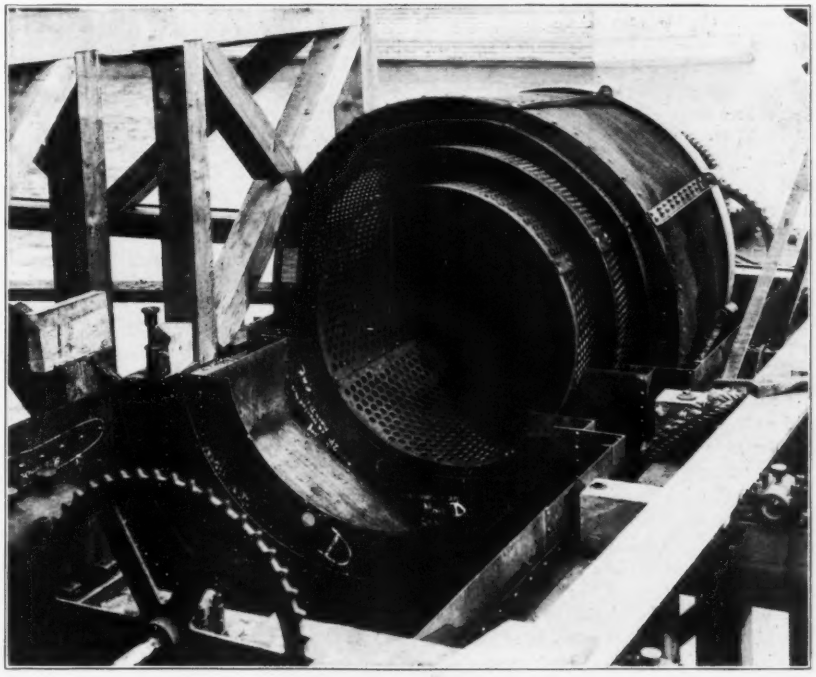
THE REMARKABLE rate at which the number of Federal-aid road building projects has increased since the war is shown in a summary relating to all such work from September 30, 1916, to April 30, 1920, recently prepared. On the latter date the states had filed 2,885 project statements of which 2,790 had been approved, representing 27,796 miles of highway. The totals on April 30, 1919, were little more than one-third of these amounts. Up to May 1, of this year, 1,974 projects had proceeded to the stage at which plans, specifications and estimates had been delivered to the Bureau of Public Roads.

The plans, specifications, and estimates of 1,827 of these had been recommended for approval, representing 13,845 miles. Project agreements had actually been executed and construction work was in progress on 1,569 projects totaling 11,987 miles. In addition, work had begun on about one hundred projects for which the agreements had not actually been signed, thus expediting the progress of the work and bringing the total mileage under construction up to 13,540. The summary shows that a great reduction has been made in the time required for preliminary work before the actual construction is begun.

On the average the states have submitted project statements for nearly ninety-five per cent of their respective allotments and have entered into agreement to construct highways which call for about one-half of their federal aid money. The projects actually completed and paid for are comparatively few, but they are materially exceeded in number by those which are practically completed.



Triple-jacketed gravel screen developed by the Columbia Digger Co. for use on new floating screening plant



Another view of screen showing construction details

Practical Chemistry for Lime and Cement Manufacturers

XV—Thermo Chemistry—The Chemistry of the Combustion of Fuels

By Richard K. Meade, M. S.
Consulting Chemical and Industrial Engineer, 11-13 E. Fayette St., Baltimore, Md.

WHEN CHEMICAL COMBINATION takes place heat is generated and when decomposition takes place heat is absorbed. Thus when carbon and oxygen unite to form carbon dioxide, heat is generated. On the other hand, if carbon dioxide is decomposed by passing it over red hot carbon, heat is absorbed. The amount of heat liberated or required by any chemical reaction is fixed. That is to say the quantity of heat liberated by burning a pound of carbon will always be the same. And also the quantity of heat which must be supplied to decompose carbon dioxide will always be the same. The heat which must be supplied to decompose a body is the same as that which will be liberated when the elements into which it has been resolved recombine.

When we write the chemical equation $CO_2 + C = 2CO$, we do not express all the factors which enter into the reaction but merely the products before and after the reaction takes place. To bring about this chemical reaction it is necessary to supply to the materials a given amount of heat. Likewise in the equation— $H_2 + O = H_2O$, we do not take into consideration the heat formed by the union of the hydrogen and oxygen. The amount of heat given off by the union of definite volumes of hydrogen and oxygen in burning is always the same. The amount of heat given off by hydrogen in uniting with oxygen is the same as that required to decompose the products of this combination, water. The heat given off by the union of hydrogen and oxygen may be also considered the heat of formation of its product water.

The heat of formation or the heat of combination is, therefore, the heat given off (or absorbed) when a body is formed from its elements. The heat of decomposition is the same as the heat of combination, except that it has the opposite sign. That is, if 97,200 calories are liberated by the formation of 44 grams of carbon dioxide, 97,200 calories will be required to decompose it.

The heat given off by a reaction is usually measured by means of a calorimeter. This is a vessel in which the reaction may be made to take place in such a way that it will heat a given quantity of water. If the weight of water and of reacting substance is known and the rise in temperature is measured by means of a delicate thermometer, the heat of the reaction can be calculated. Thus is we burn 1 gram (equivalent to 0.001 kilogram) of coal in the calorimeter and this heats 1 kilogram of water 8° C the fuel value of the coal is 8 Cal. per gram or 8000 Cal. per kilogram and multiplying by 9/5, 14,400 B.t.u.

There is a very simple little calorimeter known as the Parr calorimeter which any lime plant superintendent should be able to use. Quite complete and satisfactory instructions come with the apparatus which makes its use intelligent to the layman. By employing this apparatus the manufacturer can keep track of the quality of coal he is getting.

The heats of combination of a large number of substances have been determined by various investigators, some by direct experiment with the calorimeter and some by calculation from data so obtained. In the table* following will be found the heats of combination of a few of the more important compounds.

In the table following, the heats of combination are expressed in terms of the *molecular weights* of the substances combined and of the products formed. Thus, to express the heat produced by the burning of carbon to carbon dioxide, we have—

$$(C,O_2) = 97{,}200 \text{ Cal.}$$

which means that when 12 kg. of carbon are burned by 32 kg. of oxygen, forming 44 kg. of carbon dioxide, 97,200 Cal. are produced. To find the Calories produced by 1 kg. of carbon, therefore, divide 97,200 by 12, or to find the Calories produced in the formation of 1 kg. of carbon dioxide, divide by 44, etc.

The use of the table may be easiest explained by the means of the examples:

Simple Combination: Example 1. Find the heat generated by the burning of 100 kilos of carbon.

Heat of combination $(C,O_2) = 97{,}200$ Calories or 12 kilos of carbon will develop 97,200 Calories—100 kilos of carbon will produce $\frac{97{,}200}{12} \times 100 = 810{,}000$ Calories.

When one or more substances are decomposed and then form new combinations the heat which will be formed is the difference between the heat which must be supplied to decompose the original substances and that which will be generated when the elements recombine.

Partial Decomposition: Example 2. Find the heat required to burn 1000 kilos of lime ($CaCO_3 = CaO + CO_2$).

HEAT OF FORMATION OF VARIOUS COMPOUNDS

Expressed in Kilogram-Calories per molecular weight of the substances combining and of the products formed. To convert to pounds and B. t. u. multiply by 1.8.

Compound	*Formula*	*Molecular Weight*	*Molecular Heat of Formation*
Carbon dioxide	CO_2	$12 + 32 = 44$	97,200 (gas*)
Carbon monoxide	CO	$12 + 16 = 28$	29,160 (gas*)
Water	H_2O	$2 + 16 = 18$	58,060 (gas*)
Water	H_2O	$2 + 16 = 18$	69,000 (liquid*)
Sulphur dioxide	SO_2	$32 + 32 = 64$	69,260 (gas*)
Calcium oxide	CaO	$40 + 16 = 56$	131,500 (solid*)
Calcium hydrate	$Ca(OH)_2$	$40 + 32 + 2 = 74$	215,600 (solid*)
Calcium carbonate	$CaCO_3$	$40 + 12 + 48 = 100$	273,850 (solid*)
Calcium sulphate	$CaSO_4$	$40 + 32 + 64 = 136$	317,400 (solid*)
Magnesium oxide	MgO	$24 + 16 = 40$	143,400 (solid*)
Magnesium hydrate	$Hg(OH)_2$	$24 + 32 + 2 = 48$	217,800 (solid*)
Magnesium carbonate	$MgCO_3$	$24 + 12 + 45 = 88$	269,900 (solid*)
Iron oxide	Fe_2O_3	$112 + 48 = 160$	195,600 (solid*)
Aluminum oxide	Al_2O_3	$54 + 48 = 102$	392,600 (solid*)
Methane (marsh gas)	CH_4	$12 + 4 = 16$	22,250 (gas*)
Ethylene	C_2H_4	$24 + 4 = 28$	—11,250 (gas*)
Acetylene	C_2H_2	$24 + 2 = 26$	54,750 (gas*)
Methyl alcohol (wood)	CH_4O	$12 + 4 + 16 = 32$	65,050 (liquid*)
Ethyl alcohol (grain)	C_2H_6O	$24 + 6 + 16 = 48$	73,050 (liquid*)

*Product obtained as a gas, liquid or solid as stated.

*For more extended tables consult:
Meade—"Chemists Pocket Manual."
Richards—"Metallurgical Calculations."
Berthelot—"Thermochimie."
Landolt and Bornstein—"Physikalisch-Chemische Tabellen."

The heat required to burn lime is the difference between the heats of decomposition of $CaCO_3$ and the sum of the heats of combination of CaO and CO_2.

Heat of decomposition	(Ca, C, O_3)	=	— 273,850 Cal.
Heat of combination	(Ca, O)	= 131,500 Cal.	
Heat of combination	(C, O_2)	= 97,200 Cal.	228,700 Cal.
Heat of decomposition	(Ca, O, CO_2)	=	— 45,150 Cal.

Therefore to decompose 100 kilos of $CaCO_3$, or to form 56 kilos of lime, 45,150 Calories will be needed. Hence to burn 1000 kilos of lime, there will be required $1000 \times \frac{45,150}{56} = 806,250$ Calories. To burn 1000 lbs. of lime $9/5 \times 806,250$ or 1,451,250 B.t.u. would be required, and to burn a ton of lime 2,902,500 B.t.u. Since lime is never pure $CaCO_3$, some other miner reactions take place, such as the heat (+) formed by the union of the silicates with the lime. This figure cannot be calculated exactly for the commercial product. If coal has a heating value of 14,000 B.t.u. $\frac{2,902,500}{14,000}$ or 207 lbs. would be required by theory. In practice, however, much more is used.

Complex Fuels. Example 3. What heat is developed by the burning of methyl alcohol? Methyl alcohol, CH_4O, is burned to water and carbon dioxide according to the reaction $CH_4O = CO_2 + 2H_2O$.

Hence 32 kilograms of methyl alcohol will produce, when burned, 148,270 Cal. (water produced uncondensed).

Now heat of decomposition	(C, H_2, O)	=	— 65,050 Cal.
heat of formation	(C, O_2)	= 97,200 Cal.	
heat of formation 2	(H_2, O)	= 58,060 × 2 = 116,120 Cal.	213,320 Cal.
Difference			148,270 Cal.

Heat of decomposition	(Fe_2, O_3)	=	— 195,600 Cal.
Heat of decomposition 3	(C, O)	= 3 × 29,160 = — 87,480 Cal.	— 283,080 Cal.
Heat of formation 3	(C, O_2)	= 3 × 97,200 =	291,680 Cal.
Heat of reaction			8,520 Cal.

Double Decomposition. Example 4. Calculate the heat produced in the reduction of iron ore in the blast furnace by carbon monoxide. $Fe_2O_3 + 3CO = Fe_2 + 3CO_2$.

Hence for every 112 kilos of iron produced 8,520 Cal. will be developed.

Remember! In any chemical reaction, the compounds to the left of the equality sign are decomposed, and hence in considering the heat generated by the reaction the heats of formation of these compounds are minus, while the compounds to the right are formed and hence their heats are of those of formation or plus.

(To be continued)

Use of Lime in Concrete

A DECISION recently made by the Board of Standards and Appeals of Greater New York is that which permits the use of lime in concrete construction work. The matter was brought before the board on an appeal for a ruling on the use of hydrated lime in the concrete work on a large building. After numerous hearings and testimonies, the following was adopted:

"The use of hydrated lime in all classes of concrete construction shall not be prohibited when used in accordance with the conditions hereinafter set forth.

"The hydrated lime shall conform with the Standard Specifications of the American Society for Testing Materials.

"The maximum amount of hydrated lime which may be used shall conform with the following:

1—1-½—3 Mix; 4 lbs. of Hydrated Lime per 95-lb. bag of portland cement.

1—2- —4 Mix; 5 lbs. of Hydrated Lime per 95-lb. bag of portland cement.

1—2-½—5 Mix; 6 lbs. of Hydrated Lime per 95-lb. bag of portland cement.

"For hand mixed concrete, the hydrated lime and portland cement shall be well mixed while dry.

"Hydrated lime shall not be used in concrete which is to be deposited under water."

Experienced engineers and others of the construction industry feel that the building codes of all our cities should officially recognize the value of such an admixture. The decision is a clear-cut recognition, from an authoritative source of the fact that the addition of hydrated lime in general concrete construction has definite advantages for certain purposes. A pamphlet, No. 353, for free distribution, has been issued by the National Lime Association at Washington, D. C., entitled "Hydrated Lime in Concrete."

A. S. T. M. Lime Committee Elects Officers

AT A RECENT meeting of Committee C-7 on Lime, of the American Society for Testing Materials, officers were elected to serve for two years, as follows: Chairman D. Knickerbocker Boyd, 1701 Walnut Street, Philadelphia, Pa.; Vice-Chairman H. C. Berry, University of Pennsylvania, Philadelphia; Vice-Chairman E. E. Eakins, Charles Warner Co., Devault, Pa., and Secretary Sidney P. Armsby, 512 Mather Building, Washington, D. C. Since the election additional members have been secured, so that at present the committee numbers 19 non-producers and 13 producers of lime.

A sub-committee on Chemical Analysis has been reorganized and consists of 15 members. It is actively engaged in considering constructive criticisms of the Tentative Methods for Chemical Analysis of Limestone, Lime and Hydrated Lime, with a view to revising these in such a manner as will make them acceptable for adoption as standard by the society at its next annual meeting.

A joint conference committee is being organized with committees C-1, on cement; C-9, on concrete and concrete aggregates; C-11, on gypsum, and D-4, on road materials, to consider matters of mutual interest affecting the properties and uses of sand.

Many important developments have been brought to light with reference to many subjects in which the committee on lime is interested.

Testing Materials Standards Adopted

BY letter ballot canvassed Sept. 1, 1920, the 23 tentative standards of the American Society for Testing Materials, accepted at the annual meeting in June, were adopted as standard. In addition the letter ballot was favorable to the revision in the Standard Specifications and Tests for Portland Cement providing for a 78 per cent fineness through a 200-mesh sieve. This becomes effective Jan. 1, 1921. The maximum vote cast for any standard was 158 and the maximum against 12, although the membership of the society is now well over 2800.

German Cement Prices

THE German Government has fixed new prices for cement in Germany, beginning August 1. A consideration of the development of the cement prices in Germany since the outbreak of the war is interesting. In lots of 10,000 kilos, cement was sold at the outbreak of the war for 350 marks. When the Government took over the control of this industry on January 1, 1917, it raised the price to 430 marks. By April 1, 1919, this price had reached 885 marks, and by April 1, 1920, it had reached 3,991 marks. Under the new official price list issued August 1, 1920, the price of German cement in lots of 10,000 kilos is fixed at 3,330 marks, showing the first decline since August, 1914.

To Expand National Agricultural Limestone Association's Activities

Association Will be Reorganized so as to be Composed of State Groups or Districts —Indiana Producers to Join

THE NATIONAL AGRICULTURAL LIMESTONE ASSOCIATION met at Indianapolis, Ind., on Oct. 15, and took steps to reorganize the Association so as to be able to materially expand its activities. Many Indiana producers were present, to learn of the objects of the Association, and also for the purpose of establishing an Indiana branch of the Association.

The meeting was opened by Chairman H. E. Bair, general manager of the France Stone Co., who made the introductory address, reviewing the history of the Association, the principles that it stands and fights for, and how the Association could help the Indiana producers through its laws and systems and promotional work.

F. R. Kanengeiser, general manager of the Bessemer Limestone and Cement Co., and president of the Association, further commented upon the work of the Association, and why the Indiana producers should be members of such an organization.

Benefits Derived from Associatio~

A. P. Sandles, secretary of the Association, followed Mr. Kanengeiser, and brought out quite conclusively the need of cooperation, and the elimination of wasteful competition. He showed that the Association was merely a clearing house where the producers could exchange ideas. Mr. Sandles then unraveled the wonderful future in store for agricultural limestone, explaining that the satisfactory progress made so far was due to the work of the Association, in enlisting the aid of soil experts, and the work of the agricultural experiment stations in promoting agstone. He pointed out that these people helping the cause of agstone naturally lean on the Association as spokesman and representative of the industry, and in this way the Association promotes good-will instead of antagonism, and already has the faith of the experiment stations and agricultural colleges.

Mr. Sandles then explained the work of C. R. Wagner, field representative of the National Agricultural Limestone Association, showing just how valuable he is to the Association. Mr. Wagner has been carrying the message of agstone to the farmers for the last 25 years, and doing it ably and successfully. It was pointed out that where one ton of agstone is being sold now, 10 tons will be sold eventually, and that the Association ought to have a 100% membership. The Indiana producers were urged to come in to the Association and reap the harvests with the others. Mr. Sandles closed his most excellent presentation by pointing out that the Association was an economical one, always giving value received, and that the National Agricultural Limestone Association is a big factor in the cry for increased production that is sweeping the country.

J. C. King, of the Carbon Limestone Co., Youngstown, O., also made an excellent presentation of the benefits derived from membership in the Association, bringing out the following facts: (1) To promote good fellowship among the producers is worth more than all the Association dues; (2) Learning to know and meeting each other is worth more than all the Association dues.

The executive meeting was then called to order, Mr. Sandles reading the proceedings of the previous meetings, and reports by Mr. Wagner and Mr. Kanengeiser, on the proposed uniform lime law. Mr. Kanengeiser's report is presented elsewhere in this issue of ROCK PRODUCTS.

Afternoon Session

Mr. Kanengeiser, who is chairman of the Uniform Lime Law Committee, opened the afternoon session with a discussion on the proposed law. He pointed out that they had no complaint with the establishment of a uniform lime law, and then discussed the Ohio lime law, declaring that it was a justifiable law and that its general principles were correct. Mr. Kanengeiser also declared that he had no further recommendation to make on the law, than in his first report, and also that they would meet Prof. Fippin, author of the proposed law, and let him know of their decision.

J. A. Slipher, representing the National Lime Association, said that he was present to hear the objections to the proposed law, declaring that both associations could get together and iron out any objectionable features. At this point Mr. King asked why Prof. Fippin wants to change the Ohio law, which is satisfactory to every one. Mr. Slipher declared that the law was drafted, because of the various laws in different states, and that there was need of a uniform lime law. He further stated that Prof. Fippin does not consider his law perfect by any means, but wants to incorporate ideas of other people in it. He then discussed both the chemical and physical aspects of the proposed law, declaring that analyses of limestone should be on a common basis—on oxides of lime, to better compare the different grades of limestone. The screen analysis adopted in the uniform lime law, was declared to be a series of screens adopted by the U. S. Bureau of Standards, and which were practically and scientifically correct, making possible a better comparison between different grades of limestone.

Mr. King then discussed the proposed law, stating that the law as established now in Ohio and Pennsylvania was clear and concise to the farmer, while the law proposed by Prof. Fippin was too technical. He declared that the producer has to deal with the farmer and not the scientific man, and that the farmer wants his lime in terms of purity, calcium carbonate ($CaCo_3$) and not in terms of calcium oxide (CaO), which is meaningless to him.

It was pointed out that such agronomists as Dr. Thorne and Dr. Hopkins, have said that the natural calcium and magnesium carbonate in limestone does the work, and not the calcium oxide, and that the producers were not selling their product for the benefit of technical experts. In other words, it was declared that a uniform lime law should have broad recognition, instead of being narrow and confined.

Prof. W. M. Ostrander, of Purdue University, Lafayette, Ind., was called upon the give his ideas as to the law. He declared that he and other officials of agricultural stations, sell lime for all the companies, and what he wants is selling talk and a law conforming to it. He also stated that it would be folly to draft a new law, which would take their time explaining details to the farmers, which otherwise could be utilized in selling lime. He cited the wonderful progress in the use of lime and limestone in Indiana, and declared that what he wants is a good active association, and what the

farmers want is quality and delivery in limestone.

An informal discussion followed, as to the physical aspects of the proposed law, and it was finally decided to have a meeting with Prof. Fippin to discuss the problems thoroughly.

Mr. Wagner was then called upon to explain his methods of promotional work as field representative. He did this very thoroughly and brought out the need of a field man in Indiana. Mr. Wagner also pointed out that the constitution of the National Agricultural Limestone Association was inadequate, and proposed that it be redrafted. After some discussion, a committee of three was to be appointed by Chairman Bair, to redraft the constitution, to be presented at the next annual convention.

Chairman Bair, then called upon the Indiana producers to discuss as to what form of organization they should have. A. B. Meyer, president of the Mid-West Crushed Stone Quarries Co., Indianapolis, Ind., declared that the Indiana producers were ready to join, if they would be on the same footing as the Ohio men.

In the following discussion, it was decided that the association should be reorganized so as to be composed of state groups or districts, which would pay their portion of dues to the National body, and also be governed by it. The State groups will carry on their own promotional work, and all States will be on the same footing in the National organization irrespective of dues paid.

Mr. Meyer was appointed to call a meeting of the Indiana producers about the 10th of November, in order to effect formation of the Indiana branch of the National Agricultural Limestone Association, while the Ohio producers do the same.

It was also decided to call the annual convention sometime in January, when all the State groups would affiliate with the National Agricultural Limestone Association.

Registration

The following is a list of those present at the meeting of the National Agricultural Limestone Association:

F. W. Connell, Indiana Crushed Stone Ass'n., Indianapolis, Ind.
D. Gray, J. B. Speed & Co., Louisville, Ky.
N. E. Kelb, Ohio & Indiana Stone Co., Greencastle, Ind.
E. B. Taylor, Mid-West Crushed Stone Quarries Co., Greencastle, Ind.
John Collett, Mid-West Crushed Stone Quarries Co., Ridgeville, Ind.
A. B. Meyer, Mid-West Crushed Stone Quarries Co., Indianapolis, Ind.
H. E. Bair, France Stone Co., Toledo, O.
W. M. Brown, France Stone Co., Toledo, O.
Harry Brandon, Ohio Marble Co., Piqua, O.
J. F. Rhodes, Newcastle Lime & Stone Co., Newcastle, Pa.
F. R. Kanengeiser, Bessemer Limestone and Cement Co., Youngstown, O.
Clyde Calvin, Bessemer Limestone & Cement Co., Youngstown, O.
J. C. King, Carbon Limestone Co., Youngstown, O.
A. N. Spencer, Spencer-Whitlow Co., Columbia, Mo.
J. A. Slipher, National Lime Association, Washington, D. C.
C. R. Wagner, National Agricultural Limestone Association, Columbus, O.
A. P. Sandles, National Agricultural Limestone Association, Columbus, O.
Claude L. Clark, National Agricultural Limestone Association, Columbus, O.
F. M. Fields, Ramona Stone Co., Ramona, Ind.
B. L. McNulty, Mitchell Lime Co., Chicago, Ill.
C. R. Yates, St. Paul Stone Co., St. Paul, Ind.
M. R. Grinnel, Spring Lee Mills, Yellow Springs, O.
O. H. Binns, Casparis Stone Co., Kenneth, Ind.
Prof. W. M. Ostrander, Purdue University, La Fayette, Ind.
C. A. Breskin, Rock Products, Chicago, Ill.

Agricultural Lime Called "Fertilizer Insurance"

T. B. HUTCHESON, agronomist of the Virginia Agricultural Experiment Station, speaking at the Virginia-Carolina fertilizer salesmen's school at Richmond, September 21, paid agricultural lime the following tribute, according to the "American Fertilizer," the spokesman of the commercial fertilizer industry:

"Prof. Hutcheson emphasized the importance of putting organic matter in the soil, and claimed that *lime in association with fertilizers is so helpful as almost to entitle lime to the claim of being an insurance to fertilizers.* The experimental results in Virginia justified this claim. Most of the soils of Virginia need lime as a soil amendment, but lime in no case could take the place of fertilizers. As a rule, he thought that more fertilizer would go with more lime.

"As to plant food recommendations, he said that the same recommendations are not given for all soils, because soils are derived from different rocks that contain different proportions of plant food. Roughly speaking, there are three soil divisions in Virginia: the limestone of the upland and valleys, the Piedmont or middle Georgia, and the coastal plain.

"In the limestone region the soils contain considerable phosphorus and potash. The Piedmont or red clay soils generally contain considerable potash, while the sandy soils of the coastal plain contain little of any kind of plant food. Hence in the limestone region and red soils potash is not recommended for corn, but in coastal plain is it recommended.

"But soils are not always a determining factor as to the kind of fertilizer to recommend. There are two groups of plants, the strong feeders and the weak feeders. Wherever weak feeders, such as tobacco and potatoes are to be grown, the required plant food must be given regardless of the soil type. The strong feeders, such as corn, that grow over a long period, can get at more of the soil's natural store and therefore require less of certain elements.

"Nor can the soil be depended upon as a guide in another respect. Some one element that is lacking or inactive may stand in the way of the plant utilizing other elements that may be present in abundance. Until that limiting factor is removed the soil's available plant food cannot be fully utilized. The soils of Virginia are low in available phosphorus, therefore it is recommended that heavy applications of phosphorus be made regardless of soil type.

"The analysis of the plant foods contained in a mature plant, he said, is not an index as to the fertilizer requirements. If tobacco were fertilized on the basis of its plant food elements the fertilizer formula would be a 6-1-5. This would not feed a tobacco plant. The reason more phosphorus is needed in the fertilizer than the plant takes up is that the phosphorus enters into insoluble compounds in the soil, keeping it away from the plant. When phosphorus is applied to the soil in the form of acid phosphate, it goes into solution in the soil water like sugar placed in water. All the water tastes of sugar and all the soil water penetrated by the acid phosphate has received phosphorus. Ready combinations of the phosphorus and lime in the water are made as bicalcium phosphate, the phosphorus is widely distributed and in much better condition to become available and feed the plant than when it is in the tri-calcium or rock phosphate form. Prof. Hutcheson took up different crops and showed the recommendations varied in accordance with the factors mentioned, and also according to the previous crops grown. Where legumes had been grown nitrogen may be reduced or eliminated. He also recommended putting fertilizers on those crops in the rotation where the fertilizers paid best."

Will Hamper Railroad Buying and Efficiency

WASHINGTON.—Delays in payment of money due the railroads from the Government for losses during the six months guaranty period, which followed the return of the roads to private control, will be caused as a result of a far-reaching ruling by Comptroller of the Treasury Warwick. Under the ruling, the Treasury will make no partial advances, if applied for subsequent to Sept. 1 when the guaranty expired, until a complete adjustment of the guaranty account for any particular railroad in question is made. It is estimated that of approximately $600,000,000 due to the railroads under the guaranty section of the transportation act, about $150,000,000 already has been paid. The ruling held that advances made prior to Sept. 1 were proper, but that no applications for partial advances could be honored after that date.

National Agricultural Limestone Association on Lime Law

Will Fight Enactment of the Uniform Agricultural Lime Law as Now Proposed by National Lime Association

AT A MEETING of the Executive Committee of the National Agricultural Limestone Association in Cleveland, Ohio, July 30, F. R. Kanengeiser, general manager of the Bessemer Limestone and Cement Co., Youngstown, Ohio, reported for the committee on the proposed uniform agricultural lime law as follows:

"We have not had sufficient time to give consideration to the subject of a uniform agricultural lime law. In the brief period in which we have had, we have written to the Pennsylvania Department of Agriculture at Harrisburg and to the Department of New York State, asking their opinion on uniform legislation in the several states in relation to this product.

"We have had favorable answers from them. We have had no specific recommendations to make for their consideration. We have spent our time today in the examination of the limestone law proposed by Elmer O. Fippin, manager of the Agricultural Department of the National Lime Association, Washington, D. C. Briefly we cannot subscribe to the law as proposed by Mr. Fippin. In detail our criticisms are as follows:

"Mr. Fippin proposes to classify materials for sweetening soil as "Liming Materials" and sub-list them under five heads, viz., 'a', 'b', 'c', 'd' and 'e'.

"The first one—'a'—Quick Lime is an absolutely specific product.

"The second one—'b'—Hydrated Lime is also an absolutely specific product.

"'c'—Carbonate of Lime is general; may include any form of limestone, chemical by-product or other compound, having the chemical characteristics described by carbonate of lime generally, and in a commercial way describing only a by-product, inasmuch as limestone is never classified as 'Carbonate of Lime' except in a few technical discussions, and then only described as a specific limestone.

"'d' and 'e' are descriptive of certain possible by-products.

"Mr. Fippin proposes that any material in divisions 'c', 'd' and 'e' should be sufficiently fine to pass U. S. Standard Screen No. 3; mesh opening 0.223 with 3.6 meshes per lineal inch.

"The first paragraph covering 'Classification of Materials' cannot be subscribed to in any way whatever. It is not proposed as a law to cover standardization of materials used in liming the soil. It is a classification proposed in favor of burned lime products with a very serious effort to discredit limestone. It specifies no minimum screen through which the so-called Carbonate of Lime shall pass. It would permit the sale of so-called Chicken Grit as a liming material. It would give no consideration whatsoever to the finely ground agricultural limestone on the market, which has proven amply in a number of different states to be a very superior form of material for correcting the soil acidity. It would wreck the whole structure of the Ohio law. It would wreck the efforts of the plants, and the business of all those fellows in the agricultural limestone business who make any effort to produce a high grade material through fine grinding and care and selection of the stone used.

"Under his law for license, no general average analyses could be offered to cover your product. Interpretation of his licensing method would almost mean that a technicality might arise wherein every shipment would almost require a license, inasmuch as analyses might vary from day to day.

"On page 5 of his law his form of guarantee says nothing whatever as to the minimum size of screen mesh through which materials must pass. As it has been recognized that the fineness of the material makes for it greater activity in soil with immediate results, and inasmuch as Hydrated Lime is a very fine powder, and burnt lime breaks up when it comes in contact with water to a very fine powder, there naturally would be no necessity for such minimum screen analyses, but recognition must be given by any law to the minimum screen analysis which hopes at any time to become a uniform law, or to be reasonably fair to manufacturers of limestone.

"Mr. Fippin proposes that the oxides of lime or magnesium alone may be offered in the analyses covering chemical content. This must be opposed by us, inasmuch as it is absolutely unfair to limestone.

"We find in this law that Hydrated Lime and Burnt Lime are mentioned very frequently. The word 'Limestone' does not seem to be in Mr. Fippin's vocabulary. We have no quarrel with Mr. Fippin on that account, but we must remember that we are asked to co-operate with the writing of a uniform lime law. Such a law, if written, must by all means be fair. Our position, as producers of agricultural limestone, is such that our product has so far outstripped hydrated lime in its popularity with state, county officials and with the farmer himself, not only because of its intrinsic worth in the soil itself, but because of the lower price at which it can be purchased, that we must jealously guard our own interests.

"Your committee has a tentative plan which recommends that if it is necessary to make an immediate statement on the uniform lime law that we recommend to any legislature, which may be considering this law, the law as written in the statutes in the State of Ohio, which is eminently fair, which was written by an association composed by both lime and limestone producers, is as good, clean-cut an example of the law covering this work as can be had. We go on record as recommending this law as a standard from which any attempt at uniformity of legislation should be governed. We ask that this committee be continued. That it be given power to take action to refute any attempt to enact the law proposed by Mr. Fippin and that they be authorized to confer with Mr. Fippin, if that be necessary, so that the interests of all producers may be honestly considered. Your committee does not oppose the enactment of a uniform lime law, but we feel it must have a law which would adequately meet the needs of the limestone producer."

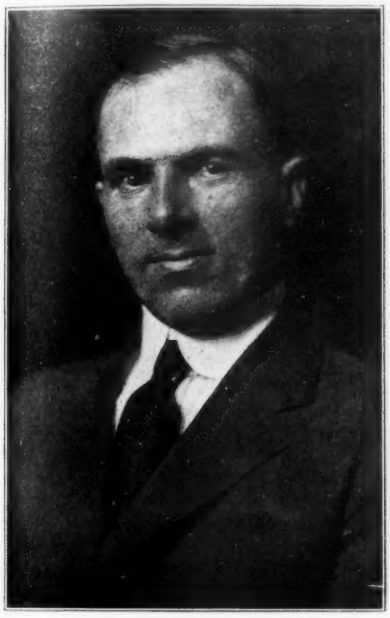
This committee is composed of W. M. Brown, of the France Stone Co., Toledo, Ohio, and A. B. Meyer, of the Mid-West Crushed Stone Quarries Co., Indianapolis, Ind., besides Mr. Kanengeiser, who is chairman.

THIS LAW was discussed in full detail at a meeting of the National Agricultural Limestone Association in Indianapolis, Ind., October 15. It was decided to hold a meeting with Prof. E. O. Fippin, manager of the Agricultural Department and secretary of the National Lime Association, Washington, D. C., to discuss the law thoroughly so as to come to some understanding as to what changes in the law will be best for all concerned. The meeting will take place shortly.

National Lime Association Activities

Technical Staff at Washington Office Now Complete

WITH THE APPOINTMENT of Dr. Major E. Holmes as head of the Chemistry Department the National Lime Association now has a complete staff of trained technical men, from whom lasting benefits to the lime industry may be expected.



L. H. Hart

Major E. Holmes

Laurance H. Hart, whose appointment as manager of the Construction Department was announced in these columns on July 3, is a graduate civil engineer of Ohio State University and an experienced designing and construction expert. He belongs to the American Society of Civil Engineers and is a forceful and ready speaker. The Lime Association have made his services available for consultation on any phase of the use of lime in building operations from plaster and brick work to stucco and concrete.

Dr. Major E. Holmes is a graduate of Indiana and Cornell Universities. His industrial experience has extended to practically all departments of a manufacturing plant, but has been particularly along the lines of technical control of factory production, development of new products and the direction of technical research and the preparation of technical literature, consequently he is well qualified for his new duties. He is a member of the American Chemical Society and other scientific organizations. Dr. Holmes' services are now available to every one interested in the chemical uses of lime.

New Patent Relating to Chemical Use of Lime

A PATENT has recently been granted to Rudolf Tambach, a resident of Germany, for a process of producing basic tannate of calcium. The inventor has assigned his American rights to The Chemical Foundation, Inc., of Delaware.

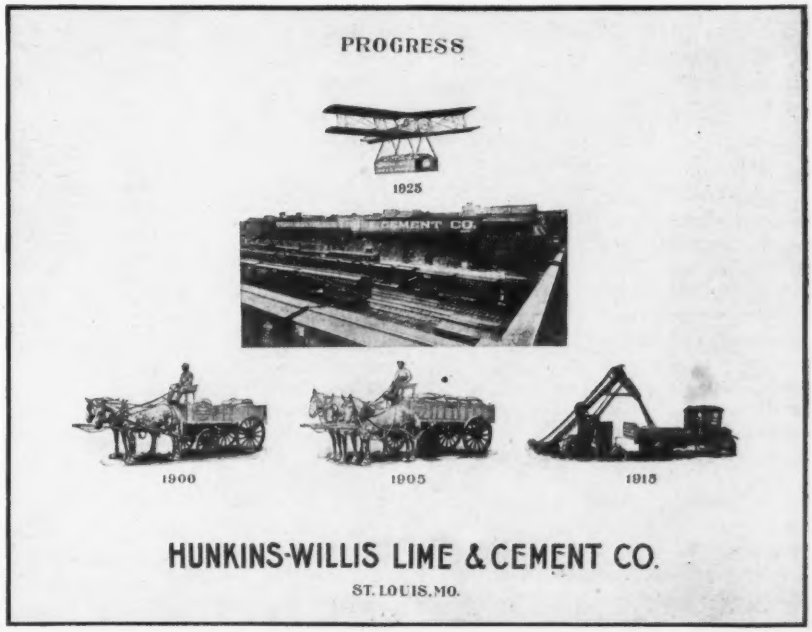
The process is described as follows:

1. The process for producing basic tannate of calcium which consists in heating a solution of calcium hydroxid (hydrated lime), tannic acid and water for such a period as to render the product difficult in dissolving in dilute acid, filtering the product thus produced, washing the same with water and then drying and finally powdering and screening the product.

2. The process for producing basic tannate of calcium which consists in heating a solution comprising 2 kg. of calcium hydroxid, 5 kg. of tannic acid and 25.1 of water to about 100° C. for a period of about six hours or until a test of the product of reaction will be found to difficultly dissolve in dilute acid, filtering the product and washing it with water, and then drying the product and powdering and screening the same.

A Live Lime Man

"KEEP UP with the Joneses" is evidently the motto of the Hunkins-Willis Lime & Cement Co., St. Louis, Mo. The poster below shows that one lime manufacturer at least believes the lime industry can be kept up-to-date as well some others. Gordon Willis, president of the Hunkins-Willis Lime and Cement Co., is the man.



Attractive poster of a progressive lime manufacturer

Mishandling Coal Problem Blasts Hopes of Construction Industry

Interstate Commerce Commission's Control of Coal Distribution and Coal Producers' Greed for Export Threaten Entire Construction Program for 1921

TWO THINGS have happened since the October 9 issue of ROCK PRODUCTS to throw dismay into the ranks of building material producers. One is the issue of Interstate Commerce Commission Service Orders Nos. 20 and 21 further restricting the use of open-top cars for other material than coal, and the other is the strike of British coal miners and the fresh impetus it is giving to export of American coal, and consequently to price increases for domestic coal.

The first of these is an acknowledgment of one of the worst cases of government mismanagement on record—an attempt to control the distribution of coal by priorities and permits, which it seems has resulted in the favored ones being supplied with hoardings of coal to profiteer and gamble with, while domestic consumers and essential industries which could not afford to pay the price have gone without.

While this rotten system of special privilege has already enriched numerous public service officials, powerful manufacturers and coal brokers at the expense of essential construction industries and mere household consumers, the situation has now grown far worse through the British coal miners' strike and the prospect of much larger exports of American coal, so badly needed here to manufacture materials to house our population and keep it warm.

The mess the Interstate Commerce Commission has already made of the coal situation is admirably summed up by George H. Cushing, managing director of the American Wholesale Coal Association, in a recent public statement. He said in part:

Summed up, the facts are that we have produced and are producing far more than enough coal to satisfy everyone. But, in the one district of Ohio, Indiana, Michigan, Illinois and the territory north of the Missouri and west of the Mississippi Rivers, the householders for one reason or another failed to get their fair share. That lack of even distribution is not really a grave matter. It involves, probably, less than 5,000,000 tons of coal all told with nearly six months in which to deliver it. It amounts only to a minor chore under any sane handling of the coal business. We have had many worse situations in the past and have met them without the public knowing that it ever confronted any danger. However, I do not now predict that this situation will be met this year. I predict nothing at all. I have reasonable doubts for an excellent reason. The Interstate Commerce Commission has been trying all summer to influence coal distribution through its control over cars. It did not admit that such was its purpose. Instead its orders indicated that it was trying to increase the production of coal. It was the latter result which the nation expected. However, we now have been working four months under its orders and the production has not increased the output a single pound due directly to those many drastic orders. Instead, we have sustained a heavy loss if we compare this year with last. For instance, the first order of the Commission went into effect on June 9, 1920. Between June 9 and October 2, 1919, the weekly output of coal increased 3,974,000 tons. This year it increased 1,696,000 tons per week. Last year, for the week ending October 2, was 170,000 tons greater than for the corresponding week this year. So the efforts of the Commission to increase output have proved a dismal failure.

The construction industry is claimed to be second only in importance to agriculture. Directly and indirectly it is said in normal times to furnish nearly half of the freight tonnage of the railways. If these things are so why should it hold a back seat and be buncoed out of its just and legal right to live? There is only one answer, it lacks a really effective organization to insist on a fair deal. And it suffers under a tremendous handicap in the Esch-Cummins railway law. It is high time therefore that a united effort be made to remove from the Interstate Commerce Commission its tremendous power to meddle with economic laws.

Plenty of Cars for Fertilizers

THROUGH AN ARRANGEMENT made between the National Fertilizer Association and transportation authorities the movement of fertilizers during the season just closed was highly satisfactory despite the transportation shortage. Under the agreement box cars were to be furnished for 75 per cent of each plant's daily requirements. To offset the smaller number of cars furnished the shipping season was begun one month earlier. By extending the season the entire tonnage was moved to the complete satisfaction of the National Fertilizer Association. Comment is unnecessary.

Department of Justice Begs for Lower Coal Prices

A WASHINGTON dispatch to the Chicago "Tribune," Oct. 19, states:

"Attorney General Palmer has appealed to the bituminous coal operators of the country to reduce prices and a conference of the 7,000 operators of the country to consider the question has been called at Cleveland, Ohio, Oct. 26." Possibly seven coal operators will respond to the attorney general's heart-rending appeal for mercy—or shall we hear no more about it?

Editorial Comment

Railway Efficiency

A most hopeful sign of increasing the efficiency of railway labor is the action of the employees of the Lehigh Valley R. R. in taking up the company's offer to purchase stock in the company on the installment plan. The company buys the stock in the open market and re-sells it to employees without profit. One thousand employees of the company already own an average of 4.4 shares each.

Many employers of labor still oppose profit-sharing plans on the ground that the employer stands to take all the risks and carry all the losses while the employees share only in the profits. If this is a valid argument against most profit-sharing schemes it does not hold against such joint ownership as the case of the Lehigh Valley R. R. If this experiment proves successful and is generally adopted it can mean nothing but greater efficiency, greater service and more courtesy on the part of the railways.

Uniform Cost-Keeping

One of the most helpful things a trade association can do is to standardize cost-keeping and secure the general adoption of such uniform methods. The primary object of uniform cost-keeping is of course to prevent members from cutting prices for want of accurate knowledge as to what their costs really are.

A step farther is the exchange of unit cost data between members of an association. This is educational and is generally considered a benefit to the trade. The final step in progress along the same line is the making public of unit costs, properly prepared in the form of regional averages. The coal industry through the National Coal Association did all these things.

The coal men started with the same idea that all business men have—to see that they got back at least what they put into the mining, preparation and marketing of the coal. To prove their good faith they willingly furnished the Federal Trade Commission with statistics of their monthly unit costs. All went well until the price of coal mounted above all justifiable limits, and then the coal operators regretted the publicity given costs, and to a very large extent have since refused to co-operate with the Federal Trade Commission in giving these costs publicity.

In other words the coal operators, when they weren't making much of any profit, probably sincerely believed that they would be satisfied if they could only be sure of a fair profit, but when the opportunity came to make more than a fair profit, in general, they could not resist the temptation.

The building material producers are hardly likely to ever be in the same muddle because coal is a non-competitive commodity, for which, practically speaking, there is no substitute, while no building commodity, with the possible exception of portland cement, can be said to be in this class. Nevertheless, the experience of the coal industry in uniform cost-keeping development to its logical conclusion, is interesting and instructive.

Industrial Expositions

The past few weeks have seen two great national expositions of industries in which rock products producers are vitally interested. These were the annual Exposition of the Chemical Industries at New York and the National Dairy Show at Chicago. Few people who have not followed closely the progress of the American chemical industry since the beginning of the war have any comprehension of its present size and importance. The importance of the dairy industry and agriculture in general, on the other hand, is pretty widely recognized.

Lime or limestone is a basic material in many important chemical industries. Lime or limestone is the very foundation of agricultural forage crops and the dairy industry. Was lime or limestone represented at these two national expositions? It was not.

One might have traveled the length and breadth of four floors of the Grand Central Palace in New York during the chemical show without knowing that there is such a chemical as lime, or that it is ingredient in any chemical process. Is it any wonder then that when manufacturers of chemicals want lime, in many cases they *make it* themselves? Is it any wonder that some of the best equipped lime plants in the country are those that are a part of these chemical plants? Is it any wonder that the lime industry is losing its grasp on the chemical field?

Certainly it is a great mistake for the oldest and undoubtedly one of the most fundamental chemical industries —*the lime industry*—not to be seen and heard at a National Exposition of the Chemical Industries. Just think of the opportunity to bring lime into the foreground! Just think of the opportunity for assembling some of the foremost chemists in the nation for a symposium on "Lime in the Chemical Industries!"

And at the National Dairy Show the only agricultural lime in evidence was a little saucerful of ground limestone in the exhibit of a patent cattle-food manufacturer. Under the name of "vitality milk ration" this manufacturer compounds cottonseed meal, old process linseed oil meal, corn gluten feed, corn feed meal, wheat brand, wheat middlings, ground oats, ground barley, *calcium carbonate*, and salt. A fine exhibit for lime, the universal soil sweetener and fundamental milk producing ration!

Accident Prevention

Safe Use of Hoisting Apparatus

(Prepared for "Rock Products" by the engineering staff of the National Safety Council)

ABOUT ONE-THIRD OF ALL INDUSTRIAL ACCIDENTS occur in handling materials. The greater number of these accidents probably happen to workmen while handling material by hand, but by far the more serious accidents occur in connection with handling material by mechanical means such as overhead traveling cranes, freight elevators, belt conveyors, power-driven trucks, locomotive cranes, derricks of various types, chain hoists, electric hoists, or other means whereby the material is picked up and transported from one location to another. Thousands of accidents are met with every year in the handling of this equipment, and many of these result in the serious injury of some workmen.

Hand and Electric Hoists—Block and Tackle

Blocks threaded with manila rope are used for suspending scaffolds, and for many other industrial purposes. Particular care should be taken that the lashing or fastening to the upper block is safely and securely made, and of sufficient strength to sustain easily any load which may be hoisted by the block. The use of old rope and rusty wire for such fastenings should be avoided.

Chain Hoists

Chain hoists may be used in locations where overhead cranes cannot be installed on account of lack of head room. They also fill a demand for handling heavy pieces at machines where there is frequent need for a hoist. One chain hoist may be utilized to handle the work at one, two, or more machines.

It is recommended that all load sustaining parts of chain hoists be made of steel rather than cast iron. It is better to use chain hoists of a larger capacity than the regular work requires because of the added safety factor. Workmen will often overload hoists and the danger of breaking chains or other parts is not so great where hoists of ample capacity are used.

Each hoist should be equipped with a braking device which will automatically lock the load when hoisting is stopped.

Care of Chains

As a matter of economy, chains and sheaves should be lubricated at intervals depending upon the atmospheric conditions of rooms in which they are used. In dusty locations where dust and grit are likely to get into the chain and into the sheave bearings, once a week is not too often. In machine shops where conditions are cleaner, once a month may be sufficient for oiling. The life of the equipment will be increased many times by keeping it properly oiled.

A practice which often leads to accidents is the use of bolts and nails to shorten chains which have become stretched. If one side of a double chain has been stretched, some careless workman may insert a bolt or a large nail between two links and thus shorten the stretched side of the chain so that it is equal in length to the other side. Such a practice puts a severe strain on the chain and should not be permitted.

The splicing of a broken chain by inserting a bolt between two links with the head of bolt and the nut sustaining the load, or of passing one link through another and inserting a bolt or nail to hold it, is sometimes done by careless workmen. Under no circumstances should any such dangerous practice be countenanced. Stretched and broken chain should be withdrawn from service.

A list should never be made with a kink in the chain or unless the chain is perfectly straight.

Hooks

The type and design of hook depends upon the work to be handled. Be sure that the hooks used for each class of work are correctly designed to lift the loads without overstraining any part of the hook.

Forged steel hooks are preferable for us in every case, and especially for lifting heavy loads. Cast steel hooks frequently contain defects such as blow holes which cannot be detected by inspection. Hooks of every large capacity are frequently of the laminated type—built up of steel plate.

Hooks which have become bent on account of overloading should not be straightened and put back into service, but a new hook should be provided.

(To be continued)

Ninth Annual Safety Congress at Milwaukee

EIGHT years ago a handful of enthusiasts met in Milwaukee and formed what is now known as the National Safety Council. In the ninth annual convention of that organization, held in the same city on Sept. 27 to Oct. 1, the registration was over 2700. The tremendous growth of the council is further evidenced by the fact that the original membership was 40 and the budget for the first year $1400, whereas there are at present 4079 members, and the annual expenditures exceed $230,000.

The following were elected officers of the National Safety Council for the year at the congress:

President, Charles P. Tolman, chief engineer of the National Lead Co., New York City.

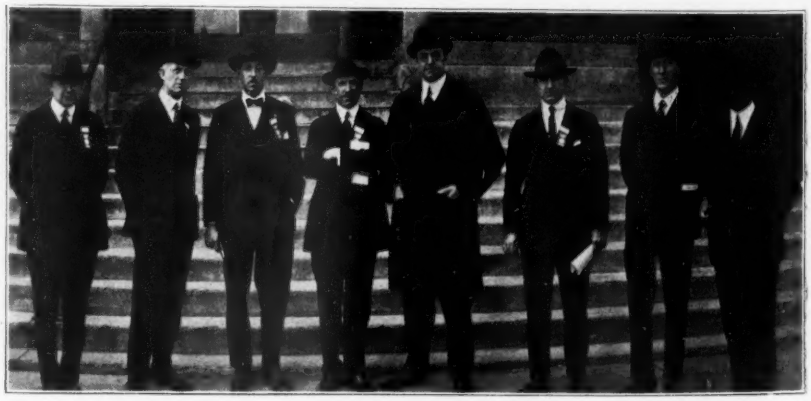
First vice-president, W. H. Cameron, secretary-treasurer of the Workmen's Compensation Service Bureau, New York City.

Second vice-president, L. A. DeBlois, Manager of Safety Section, E. I. du Pont de Nemours & Co., Wilmington, Del.

Third vice-president, W. E. Worth, Assistant Manager, Industrial Relations Department, International Harvester Co., Chicago, Ill.

Fourth vice-president, John A. Cartel, Safety Engineer, Carnegie Steel Co., Pittsburgh, Pa.

C. W. Price, general manager; Sidney J. Williams, secretary; W. H. Frater, treasurer, and R. T. Solensten, assistant secretary.



NEW OFFICERS OF THE NATIONAL SAFETY COUNCIL

Left to right: W. H. Frater, treasurer; C. W. Price, general manager; L. A. DeBlois, third vice-president; W. H. Cameron, first vice-president; C. P. Tolman, president; W. E. Worth, second vice-president; J. A. Oartel, fourth vice-president; S. J. Williams, secretary and chief engineer

See No Hope Lower Prices of Building Materials

Latest Order of Interstate Commerce Commission Gives Cement and Lime Manufacturers a Jolt

CHEAPER BUILDING MATERIALS in the spring of 1921 has been reduced to a phantom hope by the action last week of the Interstate Commerce Commission.

Vigorous protests have been lodged with the Commission by cement manufacturers and other building material interests against an order that prohibits the use of certain kinds of cars for the transportation of building materials or their use in conveying raw materials to manufacturing establishments. The effect upon the cement plants is to curtail production seriously, if, indeed, it does not necessitate a shut-down of many kilns because of the restricted supply of limestone which this order will entail.

A survey of manufacturing conditions pertaining to all the major commodities entering into the erection and equipment of buildings in this market has recently been made by The Dow Service Daily Building Reports. The results of these investigations have been appearing serially in the Sunday edition of the New York Times and in no case have conditions been found that indicate anything but present level or higher prices in the spring of next year.

The hope for present level prices was based upon the supposition that coal supply would be easier as the next building season approached its opening date, that there would be a continuation of improvement in transportation facilities afforded building material manufacturing plants, that there would develop circumstances of such a character as would encourage lending institutions to return to the building investment market and that credit conditions insuring against a return of the 1912 "shoestring builder days" would be supported. All these conditions would have insured stability of prices at present levels.

There was a fighting chance for such conditions to obtain, up to the close of the first week in this month. First there came the extremely unsettling Interstate Commerce Commission order, effective midnight, Sunday, Oct. 10. At once the manufacturing schedules of the country's cement plants became upset again, although the stock of cement in all the United States in September was only one-half of what it was a year ago at this time and only 40 per cent of what it was two years ago. Today it is actually half a million barrels less than it was thirty years ago and, under the new service order, it is steadily declining. No one can now tell how far it will drop, but it is to continue its downward course just so long as this order remains in effect. Under such circumstances it is unwise to base expectation of lowering of prices.

Prior to the receipt of this order, production of cement in the United States was on a basis that gave some hope for at least price stability. Production in September was 10 per cent greater than the corresponding month a year ago and 45 per cent greater than during 1918, the war year. More than 17,000,000 barrels of cement were produced in the nine months of 1920 than two years ago, and the shipments corresponded to the increased production, making a total of 20 per cent over 1919 and 25 per cent over 1918; all with the hope of bringing about a stabilized market as soon as possible.

As for the hope that financial interests would return to the building market again the State Legislature has effectually killed it for the remainder of this year at least. The budding construction movement that has been developing since last August has been effectually nipped by the Legislature's action in taking the proprietorship of a speculative housing builder away from him as soon as he throws his property open to tenants.

As for the investigation into building loan and building material conditions in this market it has merely created a desire on the part of many of those who contemplated building at once to wait and see whether the prices of building materials really will be forced lower.

It is natural for the customer to desire to wait for still lower prices, but if he waits until spring he will find prices much higher than they are today. This is also true of lime, plaster, cement, brick, both face and common, metals and concrete ingredients. No basic building commodities except lumber and brick and linseed oil have recently dropped in price. More have actually advanced than have declined. More will move upward as the freight rates become effective on new purchases.

No one can tell into what condition of supply the new Interstate Commerce Commission order will force manufacturers in relation to demand, but if the order is long continued it is conservatively safe to assume that the margin between stable prices and stampede prices will be increasingly great as the margin between demand and supply become narrower.

Workers Buy Road's Stock

ONE THOUSAND employes of the Lehigh Valley Railroad have purchased an average of 4.4 shares of the company's stock apiece since they were offered the opportunity to subscribe for it on the installment plan a short while ago, according to E. E. Loomis, President of the road. All classes of employes, he said, are represented among the purchasers of $200,000 worth of the stock, many of them paying for it out of the back pay given to them in the recent wage award announced at Chicago.

Mr. Loomis said that the company was making no drive to sell its stock to employes and that results have therefore been very gratifying. The company buys the shares in the open market and then sells them to the employes who make payment in monthly installments over a specified period.

If this buying of stock proves successful and is generally adopted it can mean nothing but greater efficiency and greater service on the part of the railways.

Sand and Gravel Producers' Meeting at Dallas, Tex.

AT a meeting held in Dallas, Tex., on Oct. 13, dealers in sand and gravel of Dallas and other points in the State organized the Texas Sand and Gravel Association. V. O. Johnson was elected president and E. Guy Sutton business manager. The Dallas branch, together with similar branches in Houston and San Antonio, was used for a nucleus for the State organization.

Mr. Sutton, business manager, told the association that preference had been accorded the coal interests by a ruling of the Interstate Commerce Commission in the matter of open cars.

"As long as this conditions exists, building of any kind will be practically stopped, for the producers will be unable to supply the contractors with sand and gravel and these two commodities are absolutely necessary for construction," he said.

"The sand and gravel men practically control the situation and unless the railroads release some of the cars now being held idle in large numbers on storage tracks, the producers can refuse to supply the one material needed for all buildings."

Beg Your Pardon!

IN AN ARTICLE in the September 25 issue of ROCK PRODUCTS on the taking over by the Blue Diamond Plaster Co., Los Angeles, Calif., of the Temescal Rock Co., Corona, Calif., it was stated that A. S. St. John was general manager of the Blue Diamond Plaster Co. This is incorrect in that it should have stated that Mr. St. John is manager of the Corona branch of the Blue Diamond Plaster Co.

New Machinery and Equipment

Motor Trucks in Quarries

THERE is a constantly increasing demand for motor trucks for handling rough stone from quarries to crushing plants, in place of the more common industrial railway. In Central West limestone quarries where there is usually a smooth level quarry floor, motor trucks seem to be gaining in favor for this purpose.

One of the most recent installations of this kind is that illustrated herewith. These views show the quarry and plant of Gottron Bros., building material dealers of Freemont, Ohio, who also own and operate a quarry for the production of crushed stone. Both steam shovel and portable electric conveyor are used for loading the stone in the quarry.

This was formerly a horse and wagon quarrying proposition and it is claimed that before the motor trucks were put in operation the most 6 horses and 18 men could haul was 15 to 18 tons of rock per hour. The distance from the quarry to the crushing plant is about 600 ft.

One truck and 6 men are now handling 40 tons per hour. The same trucks used in the quarry are also used for making deliveries of crushed stone and other building materials. The trucks are of the 3½-ton size and all are made by the Service Motor Truck Co., of Wabash, Ind. The first of these trucks has been in continuous service for four years. The entire expense of maintaining all four trucks, since they have been in service, is said to be $700, including two repaintings and a general overhauling.

Gottron Brothers figure that their four 3½-ton trucks average from 85 to 100 miles a day, for a ten-hour day, but they have made as high as 106 miles a day for a two weeks period. This, however, was when the trips were long and only four round trips were made a day, delivering to a job a little over 13 miles from the quarry.

In addition to the regular quarry work, Gottron Brothers have a three or four year contract for hauling stone to Sandusky Bay for rip-rap. Stone for this work is then taken direct from the quarries and hauled to the river, where it is loaded on barges and towed about 18 miles to the dumping ground. Each barge carries about 100 tons a trip.

New "Ninety" drill

New Light Rock Drill

THE DENVER Rock Drill Manufacturing Co., Denver, Colo., has recently developed a new type of light mining and quarrying drill. This new type of drill is built in three models, known respectively as Models NA-90, NRW-93 and NRD-95; the first named being a "dry" auger drill, especially designed for work in coal, iron and other soft formations; the second, a combination "wet" and "dry" rock drill for all kinds of rock and all conditions, either above or below ground; and the last named, a "dry" rock drill for work in wet shafts or where out-of-door conditions prevail. All three drills are extremely light so that they can be easily carried about, and each is operated by one man alone. They are built throughout of the very best steel compounded and with the utmost precision. While most Waugh drills are of the valveless type, the "Nineties" are equipped with an entirely new type of spool valve, having a positive action. The rotation mechanism is of exceptionally strong design in which stresses in both teeth and pawls are reduced to a minimum. Lubrication is effected by pulsations of air which gradually feed the oil from a reservoir at the side of the cylinder into all parts of the machine.

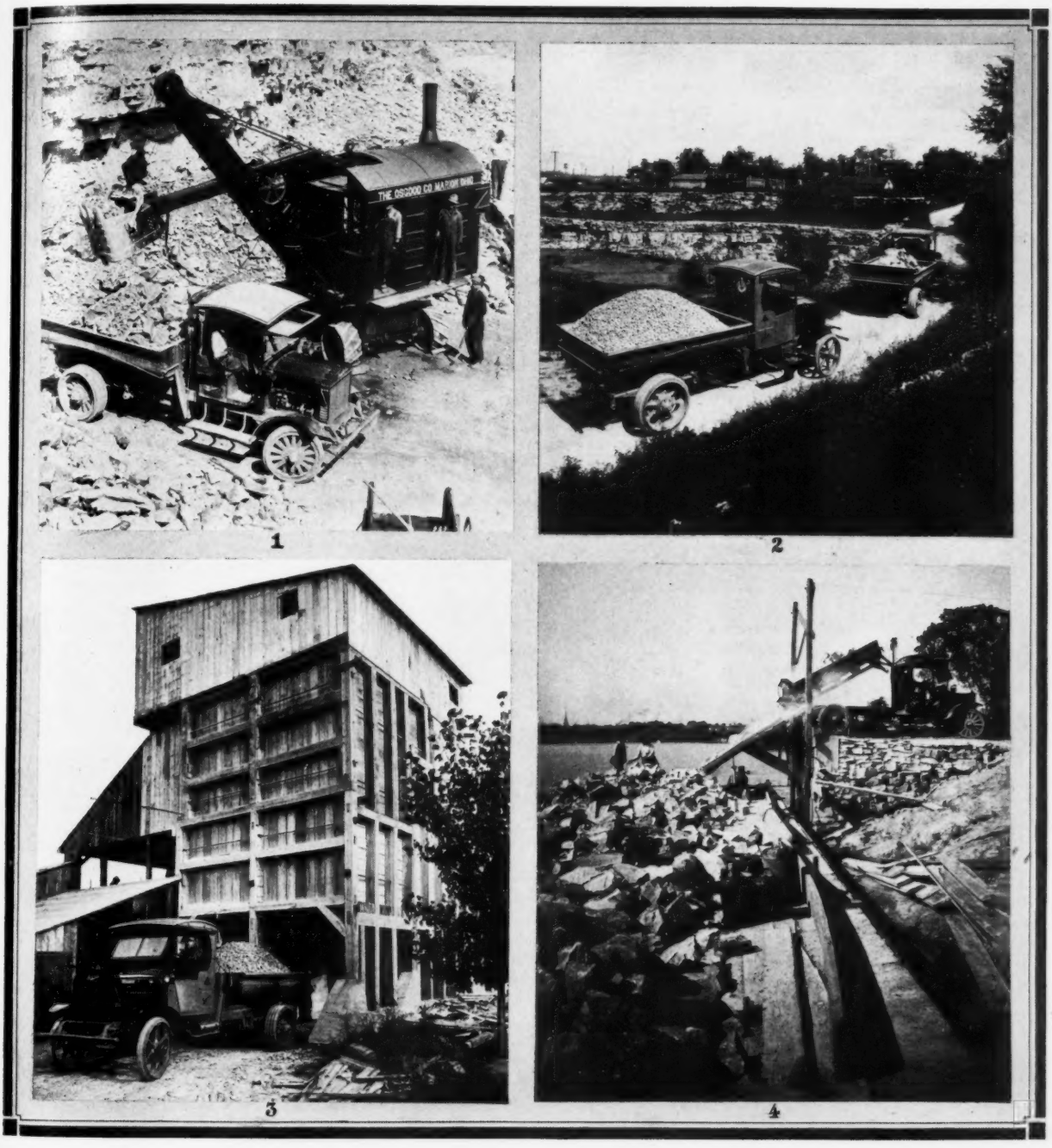
Dispatching and Routing Motor Trucks

UPON INTELLIGENT DISPATCHING and routing of trucks depends their profitable operation. In fact, these are the chief duties of the superintendent in charge of the operations of the trucks. His ability to keep paying loads moving will measure the success of their service.

System should underlie the work of the dispatcher and router. He should have a complete knowledge of the day's work at least 24 hours in advance if possible. Upon this information he can chart a schedule that will eliminate all waste time, distance and motion.

To route the trucks, an intimate knowledge is necessary of the geography

Motor trucks handling rough stone in quarry of Gottron Bros., Freemont, Ohio



1. Motor truck in quarry. 2. Hauling up rise of 35 ft. to crushing plant. 3. Crusher and bins. 4. Dumping rip rap for Sandusky harbor work

and topography of the scene of operations, whether it be city or rural territory. The dispatcher and router should know the density of traffic at various hours of the day. He should know the best hours for loading or unloading at various shipping or delivery points.

It is the aim of the dispatcher to keep truck traffic moving past his shipping platform in a cycle. He must avoid, if possible, the congestion of his entire fleet at the shipping platform, compelling part of the trucks to remain idle while waiting for loading or unloading crews.

To aid him in assigning the loads to units of the fleet and to map out time-saving schedules for their operation, the dispatcher usually makes use of a dispatch sheet. This record will show at a glance the nature of load, the distance, the time of departure, the destination and the probable time of return of any truck in the fleet.

That the installation of an efficient dispatching system is profitable is proved by the experience of an operator of 24 large trucks who in one year saved close to $30,000 in operation and maintenance expense through the elimination of idle time and wasted travel.—Furnished by the Pierce-Arrow Motor Car Co.

New Interstate Commerce Rules

All Existing Permits Revoked — Use of Open-Top Cars Further Restricted—Procedure for Securing New Permits

THE HOPE OF SECURING MATERIALS for existing contracts, which was offered by the open-top car permits of the Interstate Commerce Commission, has been temporarily removed by Service Orders No. 20 and No. 21. These orders which supersede orders No. 15 and 16 not only extend the territory affected by priority rulings, but also cancel all previous permits for the use of open-top cars to transport construction materials. (These new rulings are printed in full elsewhere in this issue.)

The former rulings of the Commission which pertained only to that territory east of the Mississippi River, are extended by the latest orders to include all territory east of the eastern boundary of Montana, Nebraska, Colorado and New Mexico. Open-top cars moving in this district are confined exclusively to the hauling of coal, except that cars moving in the direction of the mines and cars having sides 37 inches or lower may be used for other purposes.

Procedure for Obtaining New Permits

No former permits will be renewed, according to advices from the Commission, and in each case where cars are desired a new permit must be obtained. Applications should be addressed to the Car Service Commission of the American Railway Association, 718 Eighteenth Street, N. W., Washington, D. C.

The Commission has emphasized the fact that only in the most urgent cases will permits be granted. Applications are to be investigated carefully and before permits will be granted they must have the approval of the Director of the Interstate Commerce Commission Service Bureau and the Commissioner in charge of the Bureau. Of the seven hundred applications so far submitted, none have yet been approved.

In the case of permits for open-top cars to ship road materials, all applications will be forwarded to the Bureau of Public Roads for consideration. After investigation of the circumstances surrounding the individual project, these applications which receive the approval of the Bureau will be turned over to the Interstate Commerce Commission for action. Approval of the two officials mentioned above is then required. Approval of the Board of Public Roads will carry weight with the Commission, but will not assure the issuance of a permit.

Immediate Relief

A limited number of cars is available without permit, by reason of a former ruling which has been changed. These cars are of the following classes: 1. Open-top cars having sides 37 inches or less in height; and 2. Any open-top cars which are being returned to the mines. To secure the use of the latest cars, the shipping point and the unloading point must both be on the route ordinarily traveled by the cars in returning to the mines. In other words the cars cannot be diverted materially from the direct route and they must not be subject to "back shipping" or retracing their course. Whether any two points lie in the direct route to the mines must be decided by Superintendent of Transportation for the receiving line.

Securing Cars

In order to secure cars of the two available classes, contractors should communicate with the Superintendent of Transportation for the road involved. Any request for cars should give the following information:

1. Material to be shipped.
2. Name of shipper.
3. Name of consignee.
4. Location of shipping point.
5. Location of unloading point.
6. Railroad on which shipper is located.
7. Route over which cars must move.

Stating the circumstances surrounding a given construction project may serve to present a request in a more favorable light. The American Railway Association has stated that the carriers would supply cars wherever possible. If after applying to the Superintendent of Transportation for cars of the two available classes, any contractor feels that he has been subjected to discrimination in allotting the supply, he should state his case to the Car Service Division of the American Railroad Association.—From Bulletin of the Associated General Contractors of America, Oct. 16, 1920.

Price of Coal Fixed in Indiana

THE INDIANA special coal and food commission, recently appointed, has fixed prices operators shall charge for coal, which run from $2.80 to $5.85 a ton at the mines, according to kind of coal and location of the mines. The basic price is on mine run; screenings 20c less and prepared sizes 25c a ton more. Jobbers', wholesalers' and retailers' margins of profit are also to be fixed. The prospect is that jobbers will be allowed 15c a ton. Retailers told the commission they have been operating on a margin of $3 a ton above mine prices and they expect the commission to fix that rate.

Officers of the National Coal Association are greatly concerned over this step. An injunction suit was filed in August by which it was sought to test the power of the State of Indiana to regulate its coal industry in the manner contemplated by the Legislature. The application for this injunction was dismissed on the ground that "though portions of the act might be in violation of constitutional rights, relief could not be granted until the commission had entered an actual order, the effect of the enforcement of which would be to impair contracts or otherwise to deprive one of rights and privileges guaranteed by the constitution."

The coal operators intend to carry the case to the Supreme Court of the United States in order that price fixing of the character proposed may not gain a foothold.

Rush C. Butler, general counsel of the National Coal Association, comments upon the situation in the latest issue of the official publication of the organization.

"The interesting and at the same time alarming feature of the opinion of the court is that while no state in the United States has heretofore attempted any such regulation of a concededly private industry, it is apparent that the exercise of price fixing and other regulatory powers by the Federal Government during the war has made such an impression as to lead the court seriously to consider whether the exercise of those powers by the several sovereign states during times of peace may be nothing more than the exercise of the portion of the police power not delegated by the states to the Federal Government," says Mr. Butler.

"Perhaps I should not have used the word 'alarming' in speaking of this opinion, for after all the laws which govern us, whether municipal, State or Federal, rarely reflect the mind and will of the people, and the court's duty is merely to interpret and apply these laws.

"Accordingly, if it is the will of the people that such laws be enacted, it is clearly within their power by constitutional amendments if not otherwise to authorize the enactment of statutes similar to the one referred to. However, the opinion of the court may well give alarm to the coal industry if for no other reason than that the industry and no other is singled out for price fixing and regulation in this particular piece of legislation."

Potash Price Cut

THE German potash combination which for many years has been able to maintain its prices with almost absolute rigidity except as conditions made it worth while to vary them for its own advantage has announced reductions of prices for deliveries to the United States.

National Plastering Code in Progress

U. S. Bureau of Standards and Representatives of Various Industries Preparing a National Code for All Materials Used in Wall Plaster

THE BUREAU OF STANDARDS of the Department of Commerce is now engaged in the preparation of a National Plastering Code, undertaken in response to insistent requests from the industry.

It is intended that this code shall contain specifications for all materials used in wall plaster, with complete directions for their use. Results of this work will eventually form the basis of a bureau publication, which will be in such shape that it can be adopted verbatim by municipal and state legislative bodies, in the preparation of building codes.

The ground which it is proposed to cover has been divided for convenience into the following chapters: 1. Introduction. 2. Preparation for masonry surfaces, and specifications for lath. 3. Specifications for plastering materials. 4. Directions for the mixing and application of plaster. 5. Properties of the finished plaster. 6. Renovation and decoration. 7. Miscellaneous: Suspended ceilings, corner beads, etc.

To assist the bureau in this work there has been called together a conference of representatives of the various industries involved. The personnel of this conference is such as to give established authority to its findings, and is as follows:

Materials' Manufacture

Portland Cement Association, J. E. Freeman, Chicago; National Brick Manufacturers' Association, W. W. Griffiss, Baltimore; Hollow Tile Building Association, C. C. Crockatt, Chicago; Associated Metal Lath Manufacturers, Wharton Clay, Chicago; National Lumber Manufacturers' Association, R. S. Whiting, Chicago; Gypsum Industries Association, D. L. Haigh, New York, and V. G. Marani, Chicago; National Lime Association, L. H. Hart, Washington, and T. B. Shertzer, New York; National Association of Sand and Gravel Producers, E. G. Sutton, Indianapolis.

Users

Contracting Plasterers International Association, J. J. Earley, Washington; Operative Plasters and Cement Finishers International Association, J. M. Myles, Philadelphia; Wood, Wire and Metal Lathers International Union, W. J. McSorley, Cleveland.

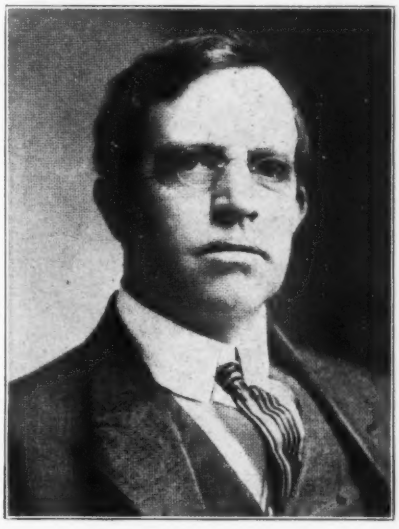
Independent

National Board of Fire Underwriters, I. H. Woolson, New York; Supervising Architect, U. S. Treasury Department, J. W. Ginder, Washington; American Institute of Architects, E. Donn, Jr., Washington, and D. Boyd, Philadelphia.

Bureau of Standards

Cement and Concrete, J. C. Pearson; Fire resistance, W. A. Hull; Acoustics, E. A. Eckhardt; Lime and gypsum, W. E. Emley, Chairman.

This conference was organized in January and work has been steadily conducted by mail since that time. The first meeting, held at the Bureau on Sept. 14, was called for a final discussion and criticism of chapters 1 and 2, which had previously been prepared and criticized by mail. Eleven members were present, and six more offered carefully prepared written communications. After a 12-hour session, all of chapter 1 and about three-fourths of chapter 2 were adopted.



A. Acton Hall

During the month the problem of standardization of sand sieves has been taken up, with the object of preparing standard samples for their testing. The Bureau at present maintains standard cement samples for checking 200-mesh sieves and these samples may be used for the determination of correction factors for such sieves thus comparing them with the standards kept at the Bureau. The difficulty in preparing a sample for the standardization of sand sieves is due to the fact that it is almost impossible to secure a material that will remain uniform. In a relatively coarse sample, such as would be required in the testing of sand sieves, there is a tendency for the various sizes of grains or particles to segregate and not remain uniformly distributed. The problem is, therefore, to devise some method of preparing a series of samples that will have absolutely the same size gradation. It is hoped that the investigation will yield some valuable results along this line and that progress in its solution can be reported soon.

Gaging Fine Cement

TECHNOLOGIC PAPER NO. 48 of the Bureau of Standards, "An Air Analyzer for Determining the Fineness of Cement," describes measurements made to determine the maximum sizes of particles passing through the 100 and 200 mesh sieves, as compared with the maximum sizes particles blown off by the Nos. 1, 2 and 3 nozzles of the air analyzer.

In reporting results of tests, it has been at times desirable to know the maximum sized particles passing through the 330-mesh sieve. Therefore, 330-mesh sieve tests and microscopic measurements were made using standard fineness, samples 46/E and 46/F. The relation of the maximum sized particles passing the 100, 200 and 300-mesh sieves and the Nos. 3, 2, 1 nozzles of the air anaylzer are as follows:

100-mesh	.00793
200-mesh	.00428
300-mesh	.44301
No. 3 nozzle	.00216
No. 2 nozzle	.00154
No. 1 nozzle	.00076

The above values are the mean results of two dimensional measurements.

A. Acton Hall Becomes a Globe Trotter

A HOST OF FRIENDS in the quarry industry will miss the genial personality and helpful counsel of A. Acton Hall, president of the Ohio Marble Co., Piqua, Ohio, who started out recently with his wife and son on a world tour, to be gone several months.

Mr. Hall is a director of the National Crushed Stone Association, the National Agricultural Limestone Association, and the Ohio Macadam Association. He is one of the leading lights in civic affairs at Piqua and prominent in state politics.

Together with his numerous other friends, ROCK PRODUCTS wishes him a happy voyage, an enjoyable journey and a safe return.

New Patented Use of Lime

A COMPOSITION adapted to form a light-weight cement for finely cut and ground vegetable material, comprising twenty pounds of casein, from twenty to thirty pounds of lime, from two and one-half to one and one-quarter pounds of caustic soda, and from five to two and one-half pounds of borax has recently been patented by J. J. Schaller, Chicago.

Sand and Gravel Men Lose Fight for Just Car Supply

Indiana Public Service Commission Upholds Interstate Commerce Commission Car Service Orders

THE PETITION FILED by the Indiana Sand and Gravel Producers Association with the public service commission of Indiana against alleged discrimination in distribution of open-top freight cars, has been answered by the commission in the following order:

"Upon the whole, the evidence seems to indicate that the car situation is rapidly improving although no assurance was offered that present conditions would prevail for any length of time. It also appears from the evidence that petitioners desire an order which would prohibit priority of movement of any commodity in open top equipment transported in intrastate traffic.

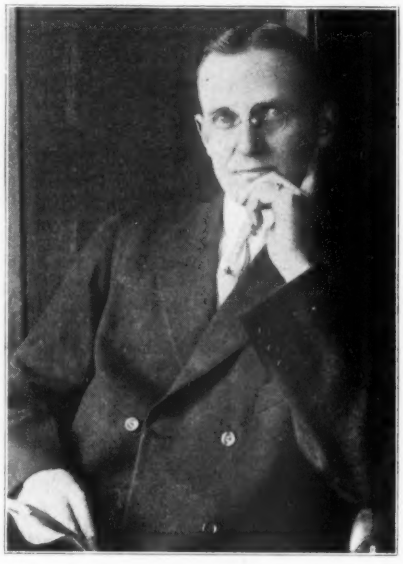
"While the Commission recognizes the seriousness of the situation, yet it is of the opinion that, at least for the present, in view of the improvement in the car situation, the present arrangement ought not be disturbed. The Commission will lend, and has lent, its influence in securing equipment in those cases which seemed to need prompt attention and with the situation showing the improvement that it has in the past few days no immediate action need be taken.

"While the need of movement of sand and gravel and other construction materials is pressing, still at this particular time the Commission is confronted with the more imperative national, as well as State, need of transportation of coal. Especially since the evidence shows a material improvement in the supply of cars to the sand and gravel trade, the Commission is not inclined to place itself in the position of complicating national and State efforts directed to increasing production and distribution of coal. This decision in no wise will be prejudicial in future considerations involving the State's power to apportion and distribute cars of common carriers.

"In view of the conclusions reached in this matter it will not be necessary to pass upon the jurisdictional questions presented in this case.

"It is therefore ordered by the Public Service Commission of Indiana, that the petition of the Indiana Sand and Gravel Producers Association, and the intervening petition of the Indiana State Highway Commission, be, and they are, denied, without prejudice, however, to any future consideration of such matters as contained in said petition, should there be a material change in conditions affecting movement of sand and gravel."

The hearing was somewhat of a disappointment to the association from an attendance standpoint. Only three sand and gravel men appeared at the hearing, while the railroads were represented by about twenty-five officials. The C. & E. I. R. R. and the Pennsylvania railroad filed answers to the petition previous to the opening of the hearing. Attorneys for the sand and gravel interests opened the case with arguments to establish the right of jurisdiction for the commission to hear the petition and promulgate orders covering the distribution of cars for intrastate shipments. Limitations of the powers of the Interstate Commerce Commission were cited and Supreme Court decisions read to substantiate the claims.



W. S. Halladay

President Huffstetter, of the state association, G. V. Miller and H. L. McGurk testified for the association and covered every issue that had any weight during the past six months of continuous battling by the producers for their rights. Mr. Huffstetter made the contention in the beginning that there was no fault to be found with the efforts of railway operating officials. He said they are doing all in their power to give the service that the public needs. Orders of the Interstate Commerce Commission were held responsible for the injustice and discrimination against the building industry. The injustice of priorities were pointed out, particularly that priority of production without direction of distribution.

The 500 per cent increase in the exportation of coal, he said, has disarranged the transportation system by increasing the long haul, changing direction of movement and adding unusual congestion and delay at seaboard, thus causing a shortage of cars for domestic coal. All the producers testified to about 30 to 35 per cent car supply for this entire season and gave many instances where business was lost or refused because of the effect of Service Orders 7, 9, 12 and 15. A compilation of 23 replies to a questionnaire from contractors was submitted by the association. More than $1,500,000 in work is reported to be delayed since a little more than three months ago. More than 5,600 cars of road materials are urgently needed this fall. Many road projects will be impossible this winter.

The railway officials testified that they were prevented from providing cars equally to all shippers under the orders of the Interstate Commerce Commission. They also brought out that the service had improved generally during the past few weeks since the filing of the petition.

The commission asked the attorneys if they wished to prepare briefs on the question of jurisdiction but not on the evidence.

W. S. Halladay Establishes New Company

W. S. HALLADAY, prominent in the crushed stone and agricultural limestone industry, and formerly connected with the Waukesha Lime & Stone Co., Waukesha, Wis., has recently established the Wisconsin Limestone Co., of Waukesha, Wis.

Mr. Halladay has been successful in securing a quarry containing a high grade material, and is at present constructing a specially equipped plant for the manufacture of agricultural limestone, as well as poultry grit.

The company has also established a soils bureau for promotional purposes. Mr. Halladay is well known to readers of ROCK PRODUCTS through his contributions on the subject of promoting limestone.

The new company has already gotten out some attractive advertising literature, including a circular, "Just Sense About Agricultural Limestone."

Mr. Halladay has become a genuine convert to limestone on the strength of his own personal experience during the past year on a five-acre "depleted, nonproductive, run-down piece of land adjoining the city of Waukesha." Views in the circular referred to above show what a single application of limestone did for his garden crops.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.			1.40 per net ton, all sizes			
Burlington, Vt.	1.00		2.50	2.00	2.00	
Calfon, N. J.	1.80	2.25	2.00	1.80	1.80	
Chaumont, N. Y.	1.75	1.75	1.75	1.50	1.50	1.50
Coldwater, N. Y.	1.80	1.80	1.80	1.65	1.65	2.00@2.25‡
Grove, Md.	1.45	2.50	2.40	2.00	1.60	1.45
North Leroy and Akron, N. Y.	1.25	1.25	1.25	1.25	1.25	1.25
Redington, Pa. (dolomite)	1.35	1.35	1.85	1.85	1.85	1.85
Utica, N. Y.	1.00		All other sizes 1.50			
Vernoy, N. J.	2.00	2.25	2.00	1.80	1.60	
CENTRAL						
Alden, Ia.	1.00		1.50	1.45	1.45	
Alton, Ill.	2.50		2.00	2.00	1.75	
Bettendorf, Ia.			All sizes, 1.75 cu. yd.			
Buffalo, Ia.		1.35	1.45	1.25	1.25	1.35
Chicago, Ill.	1.58	1.90	1.70	1.58	1.58	1.58
Cincinnati, Ohio		2.00	2.00	2.00		
Cleveland, Ohio		2.40	2.20	2.20		
Columbia, Ill.	2.15	1.90	2.00	2.00	1.90	1.90
Davenport, Ia.	1.50•	1.50•	1.50•	1.50•		
Dundas, Ont.	.75	1.50	1.50	1.35	1.25	1.20
Eden and Knowles, Wis.	1.30	1.30	1.30	1.30	1.30	
Elmhurst, Ill.	1.00@1.25	1.00@1.25	1.00@1.25	1.00@1.25	1.00@1.25	1.00@1.25
Ft. Wayne, Ind.	1.60	1.90	1.90	1.80	1.60	1.60
Greencastle, Ind.	1.25@1.50	1.35	1.25	1.10@1.20	1.10	1.10
Hull, Canada	2.50	2.30	2.50	2.10	2.00	1.75
Illinois, Southern	2.00@2.25	1.75	1.75	1.75@1.85	1.75@1.85	1.85
Kansas City, Mo.	.60	2.00				
Kokomo, Ind.	1.10	1.10	1.25	1.20	1.10	1.10
Lannon, Wis.	1.25	1.25	1.25	1.25	1.25	1.25
Lima, Ohio	1.70	1.60	1.50	1.50	1.50	1.50
Linwood, Ia.	1.00		1.45	1.25	1.25	
Mansfield, Ohio	1.70	2.20	2.00	1.90	1.70	1.70
Mayville, Wis.	.95@1.00		1.20	1.20	1.20	1.20
Montrose, Ia.	1.25	1.80	1.80	1.70	1.70	
Ottawa, Can.	3.00	3.25	3.40	2.75	2.50	
River Rouge, Mich.	1.25	1.50	1.50	1.50	1.25	1.25
St. Louis, Mo.	.60	1.60				
Stone City, Ia.	.80		1.60	1.50	1.40	
Toledo, Ohio, f. o. b. cars	1.85	2.10	2.10	2.10	1.85	1.85
Toronto, Canada	1.55	2.25	2.25	2.25	2.05	2.00
SOUTHERN:			These prices include 90c freight			
Cartersville, Ga.	2.50	2.50	2.50	2.75	2.75	2.50
Chickamauga, Tenn.	1.50	1.75	1.75	1.75	1.75	1.75
Columbia, S. C.	1.00@1.25	3.50	3.50	3.50		
El Paso, Tex.	1.00	1.00	1.00	1.00		
Fort Springs, W. Va.	1.85	2.00	2.00	1.85	1.65	1.50
Garnett, Okla.	.65		1.75	1.75	1.60	
Mascot, Tenn.		1.50	2.00		1.50@2.00	
New Braunfels, Tex.	.60	1.75	1.75	1.50	1.50	1.50
WESTERN:						
Atchison, Kans.	.50		2.10	2.10	2.10	
Blue Springs and Wymore, Neb.	.20	1.95	1.95	1.85@1.90	1.75@1.80	1.70
Kansas City, Mo.	.60	2.00				
Duluth, Minn.	1.00	2.25	2.00	1.50	1.50	1.50
Terminous, Calif.		1.00			.90	

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Bernardsville, N. J.	2.00	2.20	2.00	1.80	1.50	
Branford, Conn.	.80	1.75	1.65	1.45	1.25	
Birdsboro, Pa.	1.40	1.90	1.80	1.60	1.40	1.40
Bound Brook, N. J.	2.10	2.30	2.00	1.85	1.70	
Dresser Jct., Wis.	.75	2.45	2.45	2.15	2.00	2.00
Duluth, Minn.	1.00	2.50	2.00	1.50	1.50	1.50
E. Summit, N. J.	2.10	2.35	2.15	1.85	1.80	
Glen Mills and Rock Hill, Pa.	1.60	1.90	1.90	2.25	2.10	1.90‖
New Britain, Middlefield, Rocky Hill, Meriden, Conn.	.60@1.00	1.60@1.80	1.60@1.80	1.40@1.50	1.20@1.30	
San Diego, Calif.		1.30@1.60	1.25@1.55	1.15@1.45	1.10@1.40	
Winchester, Mass.	.85	.85	.85	2.10	1.85	1.60

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Dundas, Ont.—Flint	1.10	1.10	1.10	1.10	1.10	1.10
Hendlers, Pa.—Quartzite	.90	.90	1.20	1.45	1.35	1.10
Little Falls, N. Y.—Syenite	.90	1.30	1.30	1.50	1.40	1.30
Middlebrook, Mo.—Granite	4.00		2.00			1.50‡
Ottawa, Can.—Granite	5.50	5.00	5.50	5.00		
Stockbridge, Ga.—Granite	.50	2.00	1.90	1.75	1.75	
White Haven, Pa.—Sandstone	1.20	1.70	1.70	2.00	1.85	1.70

•Cubic yard. †Agrl. lime. ‖R. R. ballast. §Flux. ‡Rip-rap. a 3-inch and less.

Agricultural Limestone

EASTERN:

Coldwater, N. Y.—Analysis, 56.77% $CaCo_3$, 41.74% $MgCo_3$—70% thru 200-mesh, 95% thru 40-mesh; bags, $5.00; bulk 3.25

Chaumont, N. Y.—Analysis: $CaCo_3$, 92 to 98%; $MgCo_3$, 1.51%—(Thru 100 mesh); sacks, 4.50; bulk 2.75

Gasport, N. Y.—50% thru 50 mesh 3.25

Grove City, Pa.—Analysis: $CaCo_3$, 94.75%; $MgCo_3$, 1.20%—(70% thru 100 mesh); 80 lb. ppr., 5.50; bulk 4.50

Grove, Md.—(50% thru 50 mesh); paper bags, 6.75; bulk 5.00

Hillsville, Pa.—Analysis, $CaCo_3$, 96% (70% thru 100 mesh); sacks, 5.00; bulk 3.25

Jamesville, N. Y.—Analysis, $CaCo_3$, 89.25%; $MgCo_3$, 5.25%; bulk, 2.75; sacks 4.50

Syracuse, N. Y.—Analysis, 90% carbonates (50% thru 100 mesh, 90% thru 50 mesh); sacks, 3.50; bulk 2.75

Walford, Pa.—(70% thru 100 mesh; 85% thru 50; 50% thru 50; 100% thru 4); sacked, 4.25; bulk 2.75

West Stockbridge, Mass.—Analysis: Combined carbonate, 95%—33% thru 200 mesh; 66% thru 100; 100% thru 40. Bulk 2.85

Williamsport, Pa.—Analysis, $CaCo_3$, 88-90%; $MgCo_3$, 3-4%—(50% thru 50 mesh) and pulverized limestone 4.00@5.50

CENTRAL:

Alden, Ia.—Analysis, $CaCo_3$, 99.16% .80

Alton, Ill.—Analysis: $CaCo_3$, 96%; $MgCo_3$, 0.75%—90% thru 100 mesh 9.00

Bedford, Ind.—(90% thru 10 mesh) Analysis, $CaCo_3$, equivalent 98.5% 2.00

Belleville, Ont.—Analysis, $CaCo_3$, 90.9%; $MgCo_3$, 1.15% (45 to 50% thru 100 mesh; 61 to 70% thru 50 mesh); bulk 2.50

Chicago, Ill.—Analysis, $CaCo_3$, 53.63%; $MgCo_3$, 37.51%—90% thru 50 mesh 1.00

Columbia, Ill., near East St. Louis (½-in. down) 1.25@1.80

Elmhurst, Ill.—(Analysis, $CaCo_3$, 35.73%; $MgCo_3$, 20.69%) 50% thru 50 mesh 1.25

Greencastle, Ind.—(Analysis $CaCo_3$, 98%), 100% thru 10 to 12 mesh 2.00

Howenstein, O.—100% thru 10 mesh; 59% thru 50; 39% thru 100 2.75@3.00

Lannon, Wis.—(90% thru 50 mesh) Analysis, 54%, $CaCo_3$; 44%, $MgCo_3$ 2.00

Marblehead, O.—(Analysis: $CaCo_3$, 95.33%) 100% thru 100 mesh, sacks, 5.25; bulk 3.00

Mayville, Wis.—$CaCo_3$, 53.65%; $MgCo_3$, 43.72% 1.75@2.00

McCook, Ill.—Analysis, $CaCo_3$, 54.10%; $MgCo_3$, 45.04%—100% thru ¼-in. sieve; 78.12% thru No. 10; 53.29% thru No. 20; 38.14% thru No. 30; 34.86% thru No. 50; 22% thru 100 1.50

Milltown, Ind.—Analysis, $CaCo_3$, 93.10%; $MgCo_3$, 3.20%—(70.8% thru 20 mesh) 1.65

Montrose, Ia.—(90% thru 100 mesh) 1.25

Piqua, O.—Analysis: $CaCo_3$, 82.8%; $MgCo_3$, 8.2%; neutralizing power in terms of calcium carbonate, 95.3%—

50% thru 100 mesh 3.50@5.50

50% thru 50 mesh 2.00@4.00

50% thru 4 mesh 1.75@2.00

Ridgeville, Ind.—(Analysis $CaCo_3$, 98%), 100% thru 4 mesh 1.75

Stolle, Ill. (near East St. Louis on I. C. R. R.)—(Thru ½-in. mesh) Analysis, $CaCo_3$, 89.61 to 89.91%; $MgCo_3$, 3.82% 2.25

St. Paul, Ind.—Analysis, $CaCo_3$, 85%; $MgCo_3$, 12% 1.50

Stone City, Ia.—Analysis, $CaCo_3$, 98% (50% thru 100 mesh) .80

Toledo, O.—Analysis, $CaCo_3$, 52.72%; $MgCo_3$, 43%—(20% thru 100 mesh); 30% thru 50; 80% thru 100; 100% thru 5/32 screen) 1.80

Whitehill, Ill.—Analysis, $CaCo_3$, 96.12%; $MgCo_3$, 2.50%—

50% thru 100 mesh 5.00

50% thru 50 mesh 5.00

(Continued on next page.)

Agricultural Limestone

(Continued from preceding page.)

SOUTHERN:

Cartersville, Ga.—Analysis: 96% combined carbonates—All thru 10 mesh with all dust in 3.00

Claremont, Va. (Marlime)—Analysis, 90.94% $CaCo_3$, 0.31% P., 1.36% Mg., 0.37% K.; bulk 4.50
100 lb. ppr. bags 6.00
100 lb. cloth bags 6.50

Dittlinger, Tex.—Analysis, $CaCo_2$, 99.09%; $MgCo_3$, .04%.
90% thru 100 mesh 2.00
90% thru 4 mesh 1.00
50% thru 100 mesh) 2.50

Grovania, Ga.—Analysis, $CaCo_3$, 95%; $MgCo_3$, none—50% thru 100 mesh 3.00

Hopkinsville, Ky.—Analysis, 94.6 to 98.1% $CaCo_3$—Bulk 2.00

Knoxville, Tenn.—Pulverized 2.50
90% thru 100 mesh 3.00

Linnville Falls, N. C.—Analysis, $CaCo_3$, 53%; $MgCo_3$, 42%—50% thru 100 mesh; sacks, 4.50; bulk 3.00

Marion, Va.—Analysis, 90% $CaCo_3$—(50% thru 100 mesh) 2.50

Memphis Jct., Ky.—(Analysis, $CaCo_3$, 95.31%; $MgCo_3$, 1.12%); average price, ½ in. down 2.00

Mascot, Tenn.—Analysis, $CaCo_3$, 52%; $MgCo_3$, 38%.
(80% thru 100 mesh) 3.00
(All thru 10 mesh) 2.50
(80% thru 200 mesh) 5.00
Paper bags, $1.50 extra per ton; burlap, 2.00 extra per ton.

Maxwell, Va. 2.50

Mountville, Va.—Analysis, $CaCo_3$, 76.6%; $MgCo_3$, 22.83%—100% thru 20 mesh; 100 lb. ppr., 7.00; bulk 5.00

Ocala, Fla.—Analysis, $CaCo_3$, 98%—(75% thru 200 mesh) 4.50

Tyrone, Ky.—Analysis, $CaCo_3$, 90%; $MgCo_3$, 4%—90% thru 4 mesh ..... 1.75@2.25

WESTERN:

Cement, Calif.—Analysis, $CaCo_3$, 95%; $MgCo_3$, 2%—(50% thru 50 mesh) 5.00

Colton, Calif.—Analysis: $CaCo_3$, 95%; $MgCo_3$, 1½% (all to pass 14 mesh)—bulk, 3.50; bags 4.50
Sacks, 15c extra, returnable.

Kansas City, Mo., Corrigan Sid'g—50% thru 50 mesh; bulk 1.35

Terminous, Calif.—Analysis, 94% $CaCo_3$, 1.4% $MgCo_3$—(60% thru 200 mesh; 90% thru 100 mesh; 100% thru 40 mesh); sacks, 6.00; bulk 5.25

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated.

GLASS SAND:

Berkeley Springs, W. Va. ..... 3.00@3.50
Bridgeton, N. J.—Washed, 2.50; dried 3.00
Cedarville and South Vineland, N. J.—Damp, 2.00; dry 2.50
Columbus, Ohio ..... 2.50@3.00
Gray Summit, Mo. ..... 2.50@3.00
Guion, Ark.—Carlots 2.50
Hancock, Md.—Damp 2.00
Klondike and Pacific Mo. ..... 2.50@3.00
Mapleton, Pa.—Dry 4.00
Glass, damp 3.00
Massillon, Ohio 3.50
Millington, Ill. ..... 2.25@3.00
Mineral Ridge, Ohio 4.00
Montoursville, Pa.—Green, washed ..... 2.00@2.75
Morgantown, W. Va. ..... 3.00@3.25
Oregon, Ill.—Large contracts ..... 2.00@2.50
Ottawa, Ill. 2.50
Pittsburgh, Pa.—Dry, 4.00; damp 3.00
Robinson, Md.—Washed, damp 2.00
Rockwood, Mich. ..... 3.00@4.00
St. Marys, Pa.—Green 3.00
Sands, Elk Co., Pa.—Selected, green 3.00
Thayers, W. Va.—Washed 3.00
Tygarty, Ky.—Washed, not dried 2.60
Utica, Ill. ..... 1.75@2.50

FOUNDRY SAND:

Albany, N. Y.—Core 1.50
Molding fine and coarse ..... 3.00@4.00
Sand blast ..... 4.00@6.00
Brass molding ..... 3.00@4.00
Allentown, Pa.—Core ..... 1.50@1.75
Molding coarse 1.50
Arenzville, Ill.—Molding fine ..... 1.80@2.25
Beach City, Ohio—Core ..... 3.00@3.50
Furnace lining ..... 3.50@4.00
Molding fine and coarse ..... 3.00@3.50
Sand blast ..... 3.50@4.00
Bowmantown, Pa.—Core ..... 1.35@1.50
Molding, coarse 1.70

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Ambridge, South Heights, Pa.		1.30		1.30	1.00	1.00
Attica, N. Y.	.75	.75	.75	1.00	1.00	1.00
Farmingdale, N J.	.48	.48	1.70	1.70	1.40	1.40
Hartford, Conn.	.90		1.25	1.15	1.15	1.15
Leeds Junction, Me.		.60@ .75	2.00	1.75	1.65	1.50
Ludlow, Mass.	.75*	.75*	1.70		1.50*	1.50*
Washington, D. C.	.75	.75	2.00	1.40	1.20	1.20
York, Pa.		1.20@1.30	(crushed gravel)			
CENTRAL:						
Alton, Ill.	.60@ .75	.60@ .75	1.50@4.50	1.30	1.20	1.20
Anson, Wis.		.60@ .70		1.15		1.00@1.15
Attica and Covington, Ind.	1.00	1.00	1.00	1.25	1.25	1.25
Barton, Wis.		.70	.80		.80	
Chicago, Ill.		1.75@2.33	1.75@2.33			
Cincinnati, O., and vicinity	1.20	1.15	1.15	1.15	1.15	2.00
Columbus, O.		.70@1.25	1.00@1.25	.80@1.25	.80@1.25	.70@1.25
Des Moines, Ia.	1.00	.75	1.65	1.65	1.65	1.65
Earlestead (Flint), Mich.	.60	.70		1.05	.95	.95
Eau Claire, Wis.	.60	.60	1.35		1.10	
Elkhart Lake, Wis.	.75	.60	1.00	.84	.84	.84
Ft. Dodge, Ia.	1.55	1.40	2.45			2.45
Grand Rapids, Mich.	.60	.60		.90	.85	.85
Greenville, Mechanicsburg, O.	.80	.70	.80	1.00	.85	.80
Humboldt, Ia.	1.00	.85	1.90	1.90	1.90	1.90
Indianapolis, Ind.	.60	.60		1.50	.75	.75
Janesville, Wis.		.65			.75	
Mason City, Ia.	1.00	.90	2.00	1.85	1.85	1.75
Milwaukee, Wis.	1.50	1.50	1.60	1.60	1.60	1.60
Minneapolis, Minn.	.50	.50	2.00	1.75	1.50	1.50
Oxford, Mich.						1.25
Pittsburgh, Pa.		1.30	1.30		1.00	1.00
Riton, Wis.		.85				.85@1.00
Saginaw, Mich., f. o. b. cars	1.30	1.30	2.20	1.95	1.85	1.85
St. Louis, Mo., f. o. b. cars	1.65	1.70	1.85	1.65	1.60	1.60
Summit Grove, Clinton, Ind.	1.00	1.00	1.00	1.00	1.00	1.00
Terre Haute, Ind.	1.00	1.00	1.25	1.00	1.25	1.25
Toledo, Ohio	.75	.75				
Winnipeg, Can.	2.00			2.35	2.00	2.00
Yorkville, Moronts, Oregon and Sheridan, Ill.	.70@ .85	.70@ .90	.90	.80@ .90	.80@ .90	.80
SOUTHERN:						
Flomaton, Ala..		.85@1.00				2.00@2.50
Knoxville, Tenn.	1.25	1.25	1.65	1.65	1.65	1.50
Lake Weir, Fla.		.75				
Lincoln, Neb.	.90	.90	2.20	2.20		
Macon, Ga.		.75@1.00				
Memphis, Tenn.	1.40	1.40	1.50			1.50
N. Martinsville, W. Va.		1.40				1.20
New Orleans, La.		1.40*	3.00*			
Pelzer, S. C.	.90					
Pine Bluff, Ark.	1.25	.95	Washed gravel, all sizes, 2.40			
Roseland, La.		.35			1.25	
Tulsa, Okla.		.70				1.10
Waco, Texas	.70@ .80	.70@ .80				
WESTERN:						
Grand Rapids, Wyo.	.50	.50	.85	.85	.80	.80
Kansas City, Mo.	(Kaw River sand, car lots, .75 per ton, Missouri River, 1.50)					
Niles, Calif.	1.00	1.00	.90@1.10	.85@1.00	.85@1.00	.85@1.00
Pueblo, Colo.	.95	.90				2.00
San Francisco, Calif.		1.00	1.00@1.20	.85@1.00	.85@1.00	.85@1.00
Saratoga, San Jose, Calif.		.60@ .75	.60@ .70	.60@ .70	.60@ .70	.60@ .70
Vancouver, B. C.		1.30*		1.30*		1.20*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Boonville, N. Y.	.60@ .80		.55@ .75			1.00
Fishers, N. Y.	.85@1.00				1.00	
Glenville, N. Y.				1.00*		
Yardville, N. J.		.50@ .75				
York, Pa.		1.00@1.30		(crushed rock sand)		
CENTRAL:						
Attica, Covington, Silverwood, Ind., and Palestine, Ill.	.85	.85	.85	.85	.85	.85
Cherokee, Hawarden, Ia.			.80 per ton—1.20 washed			
Des Moines, Ia.			Washed con. mix., 25% gravel, 1.00; 50% gravel, 1.20			
Earlestead, (near Flint, Mich.)			.60 per yd.			
Elkhart Lake, Wis.			.90 per ton (washed concrete material)			
Ft. Jefferson, Mechanicsb'g, O.	.70	.60	.60			
Greenbush, Mich.	.65					
Hersey, Mich.			.70	.70	.70	
Janesville, Wis.		.65			.75	
Lincoln, Neb.			Sand gravel mix, 1.30			
Oxford, Mich.						.85@ .95
Saginaw, Mich., f. o. b. cars		.75	1.30	1.30	1.30	1.30
St. Louis, Mo., f. o. b. cars						1.75
Summit Grove, Ind.	.65	.65	.65	.65	.65	.65
Toledo, Ohio					.75	
Yorkville, Oregon, Moronts and Sheridan, Ill.		.75@ .85			.70	
SOUTHERN:						
Albany, Ga.	.70@1.00					
Dudley, Ky. (Crushed Sand)		1.15		1.10		
Lindsay, Tex.			.50	.50	.50	
Valde Rouge, La.						.60@ .75
Waco, Texas						.95
WESTERN:						
Saratoga, San Jose, Calif.		.60@ .75	.60@ .70	.60@ .70	.60@ .70	.60@ .70
Yorkville, Ore.		.40			.40	
Seattle, Wash.	1.25	1.25	2.00	1.25		1.25

* Cubic yard. B Bank. L Lake. || Ballast.

Crushed Slag

City or shipping point	Roofing	¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Bethlehem and Emaus, Pa.	2.50	.90	1.50	1.20	1.20	1.20	1.20
Buffalo, N. Y.	2.35	1.30	1.30	1.30	1.30	1.30	1.30
E. Canaan, Conn.	4.00	1.00	2.50	1.35	1.25	1.25	1.25
Eastern Pennsylvania and Northern New Jersey	2.50	.90	1.50	1.10@1.25	1.10@1.25	1.10@1.25	1.10@1.25
Erie, Pa.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Emporium, Pa.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Hokendaugua and Donaghmore, Pa.	2.50	.90	1.50	1.20	1.20	1.20	1.20
Lebanon, Pa.	2.50	.85	1.50	.85	.85	.85	.85
Sharpsville and Struthers, Pa.	2.00	1.30	1.70	1.30	1.30	1.30	1.30
Western Pennsylvania	2.50	1.25	1.25	1.25	1.25	1.25	1.25
CENTRAL:							
Chicago, Ill.	All sizes, $1.50, F. O. B. Chicago						
Detroit, Mich.	All sizes, 1.65, F. O. B. Detroit						
Ensley, Ala.	2.05	1.00	1.10	1.25	1.25	1.00	.95
Ironton, Jackson, O.	2.00	1.35	1.35	1.35	1.35	1.35	1.35
Toledo, O.	2.62	2.12	2.37	2.37	2.37	2.12	2.12
Youngstown, Dover, Hubbard and Leetonia, O.	2.00	1.30	1.70	1.30	1.30	1.30	1.30
SOUTHERN:							
Ensley, Ala.	2.05	1.00	1.25	1.25	1.25	1.00	.95
Longdale, Goshen, Glen Wilton and Low Moor, Va.	2.50	1.00		1.25	1.25	1.15	1.05

Agricultural Lime and Hydrate

	—Agricultural Lime— Bulk	Bags	Per Cent CaO	Per Cent MgO	Agricultural Hydrate Bags
EASTERN:					
Adams, Mass.			98	38	8.00
Bellefonte, Pa.	10.50		95.5	.72	11.50
Berkeley, R. I.			50	18	15.00
Cavetown, Md.	8.50				
Cedar Hollow, Devault, Rambo and Swedeland, Pa.	10.50		45.50	30.50	13.00
Chippewa, Pa.	6.50@7.00		78.67	1.33	
Farnams, Mass.	6.50	8.00	60	2	
Frederick, Md.	7.75		88	5 to 8	10.50
Grove, Md.	8.00				10.75
Highgate Springs, Vt.	6.00		85	2	8.00
Hyndman, Pa.	5.00	8.50	80.23	2.87	
Lime Kiln, Md.	9.50	13.50			13.50
Lime Ridge, Pa.	5.25@6.50		80.56-62.56	3.87-1.75	
Mt. Union, Pa.	6.25		93.69		
Newburgh, N. Y.			57	38	8.00
New Castle, Pa.	3.50	4.50	47.6 to 50.4	0.62 to 1.12	
Paxtang and Lemoyne, Pa.	4.00@6.00		60	12	
Rosendale, N. Y.	8.00	9.00	92	5	
Union Bridge, Md.	11.00	5.50	73	1	13.00
Williamsport, Pa.	6.25	11.00	84-87	2-3	11.00
West Rutland, Vt.	5.50	8.00	68	3	
West Stockbridge, Mass.	3.35	5.35			12.00
York, Pa.	10.50		70	3	13.00
CENTRAL:					
Alton and Hannibal, Ill.	11.50		.95		
Delaware, O.			50.0	12	13.50
Knowles and Valders, Wis.	4.00	9.00	55	45	13.00
Manistique, Mich.	11.00		95	2	11.00
Marblehead, O.					13.00
Mitchell, Ind.					13.50
Sheboygan, Wis.	5.50	8.50	58	40.5	
Woodville, Ohio	7.00	9.00	48	36	13.00
SOUTHERN:					
Blowers, Fla.	5.50		98.5		
Burns, Tenn.	10.00		96	0.54	14.00
Chippewa, Fla.	5.00		80.0	15.0	
Claremont, Va.	5.00	7.00	85-95	2-5	
Dittlinger, Texas		9.00@11.00	98.62	0.29	12.50@15.00
Erin, Tenn.	11.00		97.82	0.12	
Knoxville, Tenn.	12.00		98.5	.05	15.00
Lushing, Va.	9.00	11.25	60	15	12.75
Maxwell, Va.	6.50		84		6.50
Newala, Ala.	8.10		99.33		
Ocala, Fla.	4.00	6.00 pulv.	98½ (dry basis)		
Staunton, Va.	9.00	11.50	80.00	15.00	
WESTERN:					
Colton, Calif.	15.00		97	2	
Kirtland, N. Mex.	12.00				
San Francisco, Calif.			96	0.33	15.00
Tehachapi, Cal.	6.00	8.00	96	2	

Miscellaneous Sands

(Continued from preceding page)

Bridgeton, N. J.—Core	2.00
Cleveland, O.—Molding coarse	2.00@2.50
Brass molding	2.00@2.50
Molding fine	2.00@2.50
Core	1.25@1.50
Columbus, O.—Core	1.00@3.00
Brass molding	3.50@4.00
Glass sand	3.00
Molding fine and coarse	3.00
Conneaut, O.—Molding fine	2.25@2.50
Molding coarse	2.00@2.25
Delaware, N. J.—Molding fine	2.00
Molding, coarse	1.90
Brass Molding	2.15
Eau Claire, Wis.—Core	.60@ .70
Sand blast, wet	1.75@2.25
Sand blast, dry	3.00@3.50
Traction	.60@ .70
Fleetwood, Pa.—Furnace lining	2.25
Franklin, Pa.—Traction	2.25
Brass molding	2.50
Core	3.00
Molding fine	3.00
Molding coarse	3.00
Sand blast	5.00
Greenville, Ill.—Molding coarse	2.00@2.25
Hancock, Md.—Core and brass mldg.	1.65
Hellam, Pa.—Core	2.00@2.50
Joplin, Mo.—Stone sawing, flint	1.25
Kansas City, Mo.—Missouri River core	.80
Klondike and Gray Summit, Mo.—Molding fine	2.00@3.00
Mapleton, Pa.—Core, furnace lining, molding fine and coarse damp	2.50
Core, furnace lining, moulding, fine and coarse, dry	3.00
Massillon, O.—Molding fine and coarse	3.50
Core	3.50
Glass sand	4.00
Traction	3.50
Furnace lining	4.00
Michigan City, Ind.—Core, bank	.75
Millington, Ill.—Glass sand	2.50@3.00
Core sand	2.00@2.50
Furnace lining	2.50
Roofing sand	2.50
Stone sawing	2.00
Mineral Ridge, O.—Core, molding, sand blast, roofing, etc., washed, screened (damp)	3.00
Montoursville, Pa.—Core and traction	1.50@2.00
Brass molding	1.75@2.25
Glass sand	2.00@2.75
New Lexington, O.—Molding fine	3.50
Molding coarse	3.00
Oregon, Ill.—Core, furnace lining, molding fine and coarse	2.25@2.75
Sand blast	3.50@4.00
Ottawa, Ill.—Crude silica sand	1.25@1.50
Ottawa, Ill.—Core, furnace lining, steel molding, stone sawing	3.00
Sand blast	5.00
Glass sand	2.50@3.00
Roofing sand	3.00@5.00
Ridgeway, Pa.—Glass sand, green	2.25
Glass sand, wash	2.50
Molding, fine and coarse	1.20
St. Peter, Minn.—Glass sand	2.25
Core sand	2.25
Brass molding	2.25
Molding fine	2.25
Rockwood, Mich. — Glass sand, core, roofing, stone sawing	3.50@4.00
Sand blast	3.50@4.00
Thayer, Pa.—Traction	2.25
Furnace lining	1.40
Molding fine and coarse	1.50
Core, steel	2.25@2.50
Tygarty, Ky.—Core and stone sawing	2.60
Fire-brick sand, washed but not dried	2.15@2.40
Utica, Pa.—Core	3.00
Molding fine	3.00
Molding coarse, traction	3.00
Brass molding	3.00
Warwick, Ohio—Core, furnace lining, molding fine and coarse (dry)	3.00
Same, green	2.50
Wedron, Ill.—Core (crude silica)	1.25
Molding fine, coarse	1.25
Furnace lining	1.50
West Albany, N. Y.—Molding fine	2.50
Molding coarse	2.50
Brass molding	2.50
Zanesville, Ohio—Molding fine and brass	2.50@3.00

Crushed Gypsum

Castalia, O.—Crushed, to cement mills	4.00
Ft. Dodge, Ia.—Bulk	4.00
Grand Rapids, Mich.—Crushed gypsum rock	4.50
Gypsumville, Man., Can.—Crushed	3.50
Oakfield, N. Y.	4.00
Gypsum, O., and Akron, N. Y.	4.50@5.50

(Gypsum) Land Plaster

Castalia, O.—Land plaster	6.00
Bags extra—Jute, 3.00; ppr., 1.00.	
Garhutt, N. Y.—Land plaster, bags	8.00
Grand Rapids, Mich.—Ground gypsum rock	8.50
Mound House, Nev.—Ground gypsum rock	7.50@8.00
Sacks, .25 extra	
Oakfield, N. Y.—Ground Gypsum rock	8.00
Plasterco, Tex.	12.00
Sandusky, O.	6.00
Jute, 3.00 extra; ppr., 1.00 extra.	

Ground Rock Phosphate

Centerville, Tenn.—B. P. L., 70%; ton, 2000 lbs. (90% thru 100 mesh)	9.00@10.00
Lump rock, 72% to 75%, B. P. L.	6.00@8.50
Centerville, Tenn.—B. P. L., 65%	8.25
B. P. L., 70%	9.00@10.00
Brown rock, 75% and better	12.00
Gordonsburg, Tenn.—2000 lbs. (90% thru 100 mesh)—B. P. L., 60%	6.00
B. P. L., 65%	7.00@9.50
B. P. L., 70%	9.50
B. P. L., 72%	9.50
B. P. L., 75%	12.00
Lump rock, long ton, 70%	9.00
Mt. Pleasant, Tenn.—(B. P. L. 68%) 13% phosphorus	7.50@9.00
14% phosphorus	8.00
Mt. Pleasant, Tenn.—B. P. L., 70%	11.50
Norwills, Fla.—Fla. Hard Rock (B. P. L., 68%)	10.00
Wales, Tenn.—(B. P. L., 70%)	8.75

Florida Soft Phosphate

Croon, Fla.—Ground pebble, 30%	16.00
Pulverized soft, 26%	17.50
Jacksonville (Fla.) District	10.00@12.00
(Add 2.50 for sacks)	
Phoslime, Fla. (in burlap bags)	15.00

General News from Rock Product Markets

Pittsburgh Has Committee on Building Material Transportation

A SPECIAL committee representing the various branches of the building industries in Pittsburgh to facilitate the transportation of construction materials has recently been organized by the Chamber of Commerce.

The committee will co-operate with the Advisory Committee of the Association of Railroad Executives represented here by J. F. Keegan, General Superintendent, B. & O. R. R.

The body will have its headquarters in the Chamber of Commerce and will function only in emergency cases in the movement of building material.

The officers are F. R. Babcock, Chairman; Walter S. Wing of the Universal Portland Cement Co., Vice Chairman, and D. O. Moore, Traffic Manager of the Chamber of Commerce, Secretary.

The local committee was organized following the suggestion of Daniel Willard, President of the Association of Railroad Executives at a hearing before the Interstate Commerce Commission where he expressed a desire to co-operate in every possible way for the transportation of building materials required in essential construction.

Subsequently Mr. Willard suggested to the special committee on reconstruction and production of the United States Senate for the organization of local committees in all the large cities. Pittsburgh is among the first to organize.

Other members of the committee are C. W. Brown of the Pittsburgh Plate Glass Co., representing the glass industry; E. A. Gibbs of McClintic-Marshall Construction Co., structural steel; Walter S. Wing, Universal Portland Cement Co., cement interests; Chas. Orchard, Carnegie Steel Co., steel; A. Q. Starr, Houston Bros. Co., builders' supplies; E. M. Tate, Secretary of the Pittsburgh Builders' Exchange, and J. R. Rodgers of the Rodgers Sand Co., sand and gravel industry.

Trend Toward More Concentrated Fertilizers

IN A DISCUSSION on "Our Present and Future Supply of Phosphates," in the "Pennsylvania Farmer," Doctor Lipman recently described the attempts of the manufacturers to provide phosphates in more and more concentrated form.

In introducing the discussion, Doctor Lipman writes:

The trend both in the fertilizer industry and in farm practice has been of late years toward more and more concentrated as well as more readily available fertilizers. It is evident that a ton of ground phosphate rock will contain twice as many pounds of phosphoric acid as a ton of acid phosphate made from such phosphate rock. On the other hand, the phosphoric acid in ground, untreated phosphate rock is not readily available, while the phosphoric acid in the acid phosphate is readily available. For the sake of creating this availability, a ton of phosphate rock must be diluted with another ton of commercial sulphuric acid.

From what has been said above, it will be apparent that efforts are being made to meet the higher cost of transportation and handling by developing more concentrated phosphate products, and, incidentally, provide for the conservation of the supplies of phosphates by utilizing for the preparation of the higher grade products certain types of phosphate rock now regarded as unsuitable for the manufacture of acid phosphate by the sulphuric acid process.

After describing the manufacture and agricultural value of the old and new phosphates, he concludes as follows:

As the cost of freight handling bagging and overhead increases, less concentrated fertilizers become in proportion more and more expensive, while the more concentrated fertilizer, for the same reason, becomes a cheaper source of plant food. It is for this reason that many processes have been devised for treating phosphate rock so as to increase the availability of its phosphoric acid without reducing in any far-reaching way its proportionate content.—"American Fertilizer."

Prices of Lime for Export

CONSIDERABLE interest has been aroused in some quarters over a demand for lime for export to the West Indies, Central and South America. So far as can be determined the Palmer Lime and Cement Co., 103 Park Ave., New York City (plant at York, Penn.), is the only east coast company which has done much of any export business. This company has made a very thorough study of the costs involved in packing and handling lime for export and has established (September 1) the following export prices:

Lime in 50-Gallon Tight Barrels—Prices Subject to Cost of Barrels

	Ex. Warehouse	Carload Lots F. A. S.—N. Y. From Plant	Truckload Lots F. A. S.—N. Y. From Warehouse
Per ton			
In old barrels	$42.25	$36.00	$46.75
In new oak barrels	.....	51.50	.....
	Per bbl.		
In old barrels	$ 9.00	.....	.....

Hydrated Lime in Barrels—200 Lbs. Gross, 180 Lbs. Net

	Ex. Warehouse	Carload Lots F. A. S.—N. Y. From Plant	Truckload Lots F. A. S.—N. Y. From Warehouse
Per ton	$39.00	$32.75	$42.75
Per barrel	4.00	.....	.....

Lime in Slack Barrels—300 Lbs. Gross, 280 Lbs. Net

	Ex. Warehouse	Truckload Lots F. O. B. Brooklyn
Per barrel	$ 4.50	$ 5.00

Lime in Slack Barrels—250 Lbs. Net

	Ex. Warehouse	Truckload Lots Delivered Brooklyn
Per barrel	$ 3.75	$ 4.25

Crushed Slag Notes

ONE OF THE CONTRIBUTORS of the National Slag Association reports that during the height of the present car shortage 250 motor trucks were engaged in hauling material from his plant. The round trip of the extreme haul in this case was 61 miles.

* * *

Highways metallized by brick supported on rolled slag foundations are standing up satisfactorily under the most severe traffic conditions in several states. There are several hundreds of miles of this type of construction under observation with histories that range from one to eight years back of them and possessing exceptionally low maintenance records.

* * *

Producers of materials whose uses often parallel those to which slag is put, get a lot of advertising through the medium of writers of articles in the technical press and by habitual mention in text book work. There is no doubt that this occurs through carelessness on the part of such writers and authors to investigate and familiarize themselves with the field that they attempt to cover. There is a recent noticeable tendency, however, to correct past faults in this respect by more general mention or grouping of such materials.—H. J. Love, secretary of the National Slag Association.

California Railroad Commission Defies I. C. C. Orders

THE RAILROAD COMMISSION OF CALIFORNIA has sent a statement to the interstate commerce commission that hereafter it will revise rates based on policy and practical needs rather than on mandates. The commission in the letter reaffirmed its opinion "that the powers of state authority over intrastate rates have not been nullified or reduced by the transportation act," under which the interstate increases were granted.

General News from Rock Product Markets

Big Improvements by Alsen Cement Company

THE ALSEN CEMENT CO., Alsen, N. Y., is now making changes and installing new machinery in its plant that will cost upwards of $500,000. The improvements in progress include the erection of a sewage disposal plant with modern sanitary laboratories, a new hospital and a new stock building. The two laboratories and hospital are being constructed of reinforced concrete even to the roofs and are entirely fireproof.

Another important improvement is a giant electric crane, to cost $50,000. The crane will have a boom of 100 ft. spread, sufficient to reach every part of the storage yard where "clinker" is to be handled. In constructing the foundation for this crane 250 cu. yds. of cement and 12,000 lbs. of reinforcing steel are being used.

The new clinker pit will be very capacious, 20x40 ft. and 20 ft. high of foundation and surmounted by a steel tank 24 ft. in diameter and 30 ft. high.

The new stock house will be a large structure, which will replace the present large building. The foundations are now in progress.

A shed is also being erected over the shipping dock, so that cement may be loaded in any kind of weather, and the dock is to be enlarged so that three boats may be loaded at one time. The shipping output will be 4,200 bbls. of cement per day. This dock improvement will permit water communication with all points, and largely curtail dependence upon railroad shipping.

These improvements and others will result in great economies, in labor, operation and repairs. As illustrating this fact, at present there are 16 mills engaged in grinding the clinker into cement. These 16 mills will be replaced by three mills which will do three times the work. A new 200 ft. conveyor will carry the clinker into the mills.

A revolution of the power machinery is also proposed. At present power is supplied by three steam engines generating 500 h.p. each and one generating 1500 h.p., but this is insufficient and a contract has been made with the Upper Hudson Electric Corp. to supply 500 k.w. of electrical energy, equal to 450 h.p. It is designed to use electric power entirely at an early day.

With the completion of these and other improvements, the Alsen Cement Co.'s plant will be one of the most up-to-date in the country. The original plant was built according to German ideas, but in spite of all that was recently said about German mechanical efficiency, the old methods are found to be crude and antiquated in comparison with modern American methods.

The changes mentioned herein do not cover all the improvements contemplated by the company. The rapid and increasing growth of the cement industry due to expansion in its various uses, has created a demand that seems to have no limit in sight. The use of concrete for highways alone is making an immense call for cement, certain states having decided upon building all highways of concrete.

State Highway Officials to Meet

THE American Association of State Highway Officials will meet in Washington, Dec. 6, for a four-day convention. The decision to call this meeting was reached at a session of the executive committee of the association which met in Washington, Sept. 21.

Thomas H. MacDonald

The executive committee conferred at length with Thomas H. MacDonald, chief of the U. S. Bureau of Public Roads. They also had a round table discussion with the representatives of a number of manufacturers of motor trucks. The truck manufacturers advanced the suggestion that an educational campaign should be conducted among the users of trucks as to just what they should do to avoid damaging highways. If owners of trucks would do all in their power to reduce to a minimum the chance that their truck may damage a roadway, it is believed that they will be spared many burdensome regulations which are believed certain to come unless prompt steps are taken to reduce the amount of damage being caused by trucks. During the course of the conference a visit was paid to the experimental station of the Bureau of Public Roads at Arlington.

German Experiments on Fineness of Ground Limestone

THE MUCH-DISCUSSED question of how finely ground agricultural limestone should be was the subject of some pot culture experiments by two German agricultural experts recently. Limestone of five different degrees of fineness was used, having grain sizes of from less than 0.11 to 2 mm. (corresponding to about 200-mesh and 10-mesh material, respectively), and was added in amounts varying from 1,000 to 8,000 kg. per hectare (890 to 7,120 lbs. per acre).

It was found that degree of fineness and amount of application of lime had only a slight influence in the case of oats. The coarse-grained lime in relatively large additions had a favorable influence on red clover and carrots, while the fine-grained lime had an injurious effect, especially on carrots. The depressing influence of fine-grained lime on the action of bone meal phosphoric acid decreased as the lime grains increased in size. Lime of 3 mm. size had no depressing influence. The influence of lime on the action of super-phosphate phosphoric acid was determined more by the physiological behavior of the test crop than by the degree of fineness of the lime. Fine and coarse grained lime had about the same favorable influence on the nitrification of ammonium sulphate.

Immigration Rapidly Increasing

EMPLOYERS of unskilled labor are of course vitally interested in immigration statistics. Apparently up to this time quarry men and rock products producers generally have not benefited much by the rising tide of immigration, which has recently increased to several thousand a week at the port of New York alone.

One reason is that a large proportion of these new immigrants are women and children, another is that, according to statistics up to July 1, 1920, 45 per cent of the immigrants this year are English, Scotch, Irish and Welsh, who in general are not the quarry-labor type, while most of the others seem to be Polish Jews, who also do not go in for rough manual labor, but congregate in the cities.

General News from Rock Product Markets

Priority Order for Coal Indefinitely Extended

AT A SESSION of the Interstate Commerce Commission, Division 5, held at its office in Washington, D. C., on Oct. 8, 1920, the following was issued:

It appearing, in the opinion of the Commission that because of a shortage of equipment which continues to exist upon the lines of each and all the common carriers by railroad subject to the Interstate Commerce Act within the territory east of the eastern boundary of the States of Montana, Wyoming, Colorado and New Mexico, and because of the inability of said common carriers properly and completely to serve the public in the transportation of coal, an emergency exists which requires immediate action:

It is ordered, That such common carriers by railroad in the aforesaid territory which serve coal mines whether located upon the line of any such railroad or customarily dependent upon it for car supply, herein termed coal-loading carriers, be, and they are hereby, authorized and directed, until the further order of the Commission, to furnish such coal mines with open top cars suitable for the loading and transportation of coal (herein termed coal-cars) in preference to any other use, supply, movement, distribution, exchange, interchange or return of such coal cars; provided, that such coal cars may be used in service moving in the direction of the mine or mines to be supplied, on the return movement, after the discharge of the coal lading thereof, upon a route not materially out of line and to points not beyond such mine or mines; **and provided further,** that the phrase "coal cars" as used in this order shall not include or embrace flat bottom gondola cars with sides less than 38 inches in height, inside measurement, or cars equipped with racks, or cars which, on June 19, 1920, had been definitely retired from service for the transportation of coal and stenciled or tagged for other service.

It is further ordered, That all common carriers by railroad within said territory other than coal-loading carriers, (herein termed non-coal-loading carriers) be, and they are hereby, authorized and directed until the further order of the Commission to deliver daily to a connecting coal loading carrier or carriers, empty or loaded coal cars up to the maximum ability of each such non-coal-loading carrier to make such deliveries, and of each such connecting coal-loading carrier to receive and use the coal cars so delivered for the preferential purposes herein set forth.

It is further ordered, That all such common carriers by railroad in said territory be, and they are hereby, authorized and directed forthwith, until the further order of the Commission to discontinue the use of coal cars for the transportation of commodities otherwise than as hereinbefore specified (a) as to each coal-loading carrier, so long as any coal mine remains to be served by it with coal cars, and (b) as to each non-coal-loading carrier so long as deliveries of any coal cars to connecting carriers may be due or remain to be performed under the terms of this order.

It is further ordered, That all common carriers by railroad within the territory hereinbefore described be, and they are hereby, authorized and directed, until the further order of the Commission, to place an embargo against the receipt of coal or other freight transported in open top cars suitable for coal loading, as hereinbefore defined, by any consignee, and against the placement of such open top cars for consignment to any consignee who shall fail or refuse to unload such coal or other freight so transported in coal cars and placed for unloading within 24 hours after such placement, until all coal or other freight so transported in coal cars and so placed has been unloaded by such consignee, **provided,** that this authorization and direction shall not interfere with the movement of coal to any coal pool or pools when authorized by any order heretofore or hereafter entered by the Commission or coal consigned to tidewater or the lakes for trans-shipment by water, nor shall it apply where the failure of the consignee to unload is due directly to errors or disabilities of the railroad in delivering cars.

It is further ordered, That all rules, regulations and practices of said carriers with respect to car service are hereby suspended in so far only as they conflict with the directions hereby made; and that this order shall supersede and stand in lieu of Service Orders Nos. 7, 9, 12 and 15 of the Commission, as heretofore made, entered and amended or supplemented, and that otherwise the authorization herein contained are to be considered as not conflicting with or superseding any other service order heretofore entered by the Commission; and that this order shall be effective October 15, 1920.

Indiana Rate Complaint Heard

A HEARING on the complaint of the Lafayette Hydraulic Sand and Gravel Co. and the Western Indiana Gravel Co. in the matter of rates on sand and gravel shipped over the Wabash Railroad to points in Illinois was conducted by F. H. Barclay, examiner of the Interstate Commerce Commission, on October 2, at Lafayette, Ind.

The local companies allege they are being discriminated against in not being permitted a full line of rates to the points designated, while this privilege is permitted competition in Attica. It asks relief from the condition. A mass of evidence was submitted. The finding will not be announced for some time.

The complainants were represented by Attorney O. P. Gothlin, Dayton, Ohio, and the railroad counsel comprised L. H. Strasser, assistant general solicitor, Wabash Railroad, St. Louis, and A. P. Humburg, commerce counsel, Illinois Central Railroad, Chicago.

Well-Known Australian Cement Plant Engineer Now in Steel Industry

AMERICAN FRIENDS of William A. Maddern, Adelaide, South Australia, will be interested in the following extract from a recent letter. Mr. Maddern spent several months in the United States during the summer and fall of the past year visiting and studying American portland cement plants. He is now with the Broken Hill Proprietory Steel Works, New Castle, New South Wales, Australia:

"This company, already the largest industrial concern in Australia (employing about 5,000 hands), has decided to double its output by erecting two new blast furnaces, additional rolling mills, coke ovens and by-products plants, etc.

"This company only started to manufacture steel in 1915, with one 500-ton blast furnace open-hearth plant, and steel rail mill. During 1918 another furnace was added, and steel sections, rods and plates were turned out to full capacity of the plant. Now plans are being prepared to bring the capacity of the whole works up to 2,000 tons of steel per day—quite a big thing for Australia.

"Now the undreamed of condition actually exists of steel rails, sections and bars being shipped to India, China and Japan, and even to Europe—a complete reversal of things, within a couple of years or so. The iron ore (hemitite) from South Australia, is so rich that a ton of metal can be obtained from 3,000 lbs. of ore. Coal is mined here and coke ovens and by-products plants are on the works. Subsidiary factories, such as nail and wire works, steel products works, galvanized-iron and sheet-metal works, have also started operations and Newcastle seems destined to become Australia's chief manufacturing and industrial center before long."

General News from Rock Product Markets

Price Trend and Supply in the Cement Industry

IN VIEW of the severe shrinkage in the construction industry many cement users have been led to the belief that shortage conditions prevailing for some months past should soon be overcome and that possibly lower prices might be imminent. Inquiry in the industry does not bear out this idea.

While it is true that construction is at a low mark all over the country, it should be remembered that a larger proportion of cement is used in construction now than formerly. The greatest pressure of demand, however, comes from dealers supplying rural communities and agricultural districts. In such territory, small jobs which have been deferred for long periods on account of either war restrictions or, prior to the war, lack of money, are now going ahead, and these consuming units, small individually, form an enormous total.

These reasons explain why, although production is now on a greater scale than it was last year, it is below demand. Car supply, so great a factor in the past, is gradually improving, but other obstructions, such as uncertain coal supply or inefficiency or scarcity of labor, still tend to keep most plants running with an output below capacity.

Prices have recently advanced to cover the increase in freight rates, effective Aug. 26, and the outlook gives no indication of an early reduction. Certain producers are paying from 75 to 85 per cent more for their coal, on contract, than formerly. In many instances only a fraction, approximately one-third, of their need is being supplied under contract and to supply this deficiency coal has been purchased in the open market in competition with speculators and manufacturers of long-profit lines, at an advance over contract price of from $3 to $8 per ton. Furthermore, such open market purchases are frequently below the requirements in B.t.u. for the proper burning of cement to such an extent that 25 or even 50 per cent more coal is required to produce a specific quantity of finished product. Taking into consideration the fact that every dollar added to the cost per ton of coal increases the actual cost of cement five cents per barrel, it is seen that this cost has been materially raised by the prevailing coal hysteria.

Other features also add to the production cost. Car shortage means that producers must ship in whatever rolling stock is available. Much cement has been shipped in privately owned refrigerator cars, at a minimum freight charge of 50,000 lbs., when the actual capacity of the car is much less, and at the expense of a stiff rental paid to the car owners. Cases are frequent of such excess charges amounting to $25 or more on a carload, all of which must be added to the cost of cement to the ultimate consumer. Large sums have been spent in labor cost for cleaning stock cars which have been assigned by the railroads to cement hauling, and the already troublesome labor factor has been intensified by men being required to perform this unpleasant and unexpected work.

We entered the building season this spring with reserve stocks far below normal and a multiplicity of factors have kept plants running at less than capacity so that there has been no chance to overcome the deficiency. Effort is being centered now on securing quantity production rather than economy. Should we pass the next six months with fuel, transportation and labor suffering no serious derangement, the 1921 season will open with ample stocks and some possibility of lowered prices. For the present each week sees some improvement in the car situation. Each week brings us nearer to a return to reason as regards coal prices. Each week therefore sees a slight improvement in the cement situation. But we have a long road to travel before supply equals demand and before any downward revision of price scales can be expected.—Owen M. Fox, "Engineering News-Record."

Potash Deposits Will Be Developed Soon in Georgia

DEVELOPMENT of the potash deposits in Bartow County may begin actively soon, is the opinion of S. W. McCallie, State Geologist.

The American Metals Company has been working for three years in the neighborhood of Cartersville on the problem of extraction of the potash content from slate for use in fertilizers. Some of the slate has from 8 to 10 per cent potash content and experiments have reached the stage where the company is ready to make final tests to determine the commercial possibilities of the development. The chief engineer of the company was in Atlanta recently to obtain a car to ship a carload of the mineral to New Jersey, where it will be tested at the company's plant there.

In case the tests are satisfactory the company plans to erect a large plant near Cartersville and to carry on the work extensively on the large leases it has in that section.

Indiana Sand and Gravel Men Win Fight Against Increase in Intrastate Freight Rates

IN THE FACE of a general increase in intrastate freight rates, of approximately thirty-three and one-third per cent, the Indiana sand and gravel industry came out with an increase of only eleven per cent as shown by a recent ruling of the Indiana Public Service Commission. The industry in this state is pretty well pleased with the result of the strenuous fight staged to prevent the granting of the petition presented by the carriers of forty per cent increase. Some doubts as to whether it is advisable to make fights of this sort were swept away when the commission made known its ruling. Those industries that put up no fight at all were given a straight thirty-three and one-third increase, while those industries who appeared at the hearing and made it plain to the commission that an injustice was being done by granting the increase, were dealt with rather lightly.

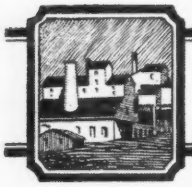
What Is Being Done to Increase Car Supply

EVIDENTLY the railroads are making a serious effort to correct transportation difficulties. This is brought out in an item published on the back of a New York Central Lines timetable under the caption of "New Equipment to Relieve Our Car Shortage." This message, which is quite comforting to all business men, is in part as follows:

"A railroad is worth to you what it can give you in transportation service. Our system, like all the railroads of the country, is short of rolling stock, and this problem is yours as well as ours. The cost of railroad inability to handle traffic falls directly on business men, and indirectly on the public at large. A considerable element in the maintenance of the present high prices is the lack of cars for prompt and adequate movement of foodstuffs, raw materials, builders' supplies and manufacturing articles.

"We have arranged to acquire new equipment which will cost $48,318,300. This will include 196 locomotives, 4,000 all-steel box cars, 4,000 coal cars, 994 stock cars, 250 refrigerator cars, 11 mail cars, 105 all-steel passenger coaches, 80 all-steel baggage cars, 30 milk cars, 12 all-steel combination cars, 15 multiple unit electric passenger cars, 12 all-steel dining cars.

"We are rebuilding 1,000 coal cars now out of service, at a cost of approximately $2,000,000, adding that number of 55-ton all-steel coal cars to our equipment."



News of the Industry

Incorporations

The Clem Gravel Co., Dallas, Tex., has been incorporated for $300,000 by A. W. Clem, J. G. Strawn and E. H. Jones.

Consolidated Construction, Power and Minerals Co., Kittery, Maine, has been incorporated for $1,000,000 to engage in mining and quarrying by John O'Donnell, Pres.; O. H. Nelson, Secy., and A. B. Cole.

The Farmers Building & Supply Co., Rockwell City, Ia., has been incorporated for $15,000 to handle brick, tile and building materials, by M. C. Ferring, Pres.; A. L. Schmidt, Vice-Pres., and C. J. Pilmier, Secy-Treas., all of Dubuque, Ia.

The Rockville Granite Co., Cold Spring, Vt., has been incorporated for $200,000 to engage in quarrying granite, marble, rock, etc., and to manufacture same for monumental purposes. The officers are as follows: F. C. Peters, Pres.; N. C. Wenner, Vice-Pres.; F. V. Stein, Treas., all of Cold Springs, and P. H. Alexander, Secy., of Rockville.

Quarries

Philadelphia, Pa.—The Glen Gery Shale Brick Co. has purchased the plant of the Reading Shale Brick Co. for $105,000, the plant having a capacity of 40,000 bricks a day.

Lebanon, Pa.—Notice is hereby given that the partnership lately subsisting between James Lloyd and Leon K. Bomberger, of the City of Lebanon, Pa., under the firm name of Limestone Products Co. was dissolved on the 23rd day of August, A. D., 1920, by mutual consent. All debts owing to the said partnership are to be received by James Lloyd and Elam Siegrist, and all demands on the said partnership are to be presented to them for payment.

Winchester, Va.—New York interests have taken a 90-day option on approximately 400 acres of rugged limestone land near Cedar Creek, Va., and experts in engineering are to begin work this week to determine the extent of the workable lime mineral. There are already six or seven large lime and stone companies operating at points along the Baltimore and Ohio Railroad between Middletown and Strasburg, and lime and stone is sent out daily by trainloads. The New York interests were induced to secure the options through James B. Russell, a Winchester financier and banker. The company indicated its intention of erecting a $300,000 plant, provided there is sufficient stone to last more than 15 years.

Cavetown, Md.—Fifteen thousand tons of limestone came tumbling into the quarries at the plant of the George M. Bushey & Sons, Inc., this place, when a blast, in which 3,100 pounds of dynamite were used, was set off. A large crowd of spectators and officials of the company were present. The entire side of a solid hill was carried into the quarry pit. Rocks of enormous size were loosened and hurled to the bottom. The work of drilling holes had been in progress for some time. Starting at the top of the hill, holes were sunk to the base of the quarries, a distance of several hundred feet. To the surprise of the spectators assembled, and who had expected a terrific shock, but little disturbance was made outside of the quarry zone.

Tempe, Colo.—Work has started on the erection of the big rock crushing plant at Tempe to furnish crushed stone for the 283 miles of cement highways in Maricopa county, according to county officials. The rock crushing plant, now under construction at Tempe, will be large enough to supply rock for the five or six road building units that the company intends to operate continuously on as many different sections. Until this plant is completed and in operation little will be done on road construction, it is said, although a small amount of grading may be done in preparation to laying the concrete as soon as the plant is in operation. The plant will be able to supply rock for a six-inch road just as easily as for a four-inch, as was originally planned. A six-inch road is said to be more durable than the four-inch and is fast becoming the standard throughout the nation. In order to lay the six-inch an additional $4,500,000 bond issue must be voted, and this is being contemplated.

Denver, Colo.—A new factory for Denver was announced with the purchase by the Columbine Granite Co. of the block between Mexico and Colorado avenues, facing Overland park. The property has 600 feet frontage on the Denver & Rio Grande railroad tracks. Officials of the company said they plan to build the most modern granite finishing factory west of Barre, Vt. The material, they announced, will be obtained from deposits near Salida.

Dallas, Tex.—Assurances of an enormous supply of rock ballast and macadam for road building in Dallas County under the $6,500,000 bond issue are contained in a letter from the North Texas Rock Co. of Chico, Wise County, to the Commissioners' Court. The company has 225,000,000 tons of rock available, according to its letter. Its plant under construction will be able to put out daily 64,000 tons, or 1,600 cars of crushed rock daily, the company claims. This plant will be in operation in four or five months. The company offers to sell crushed rock at $1.25 a ton if the county pays the freight, and gives assurance that it can get cars after Jan. 1 from the Rock Island railroad.

Cement

The Sandusky Cement Co., Dixon, Ill., is completing work on a 50,000 gallon steel water tank to supply water for the houses that are in course of construction for the employees of the plant.

The Davenport Cement Co., has been incorporated in Delaware with a capital of $6,000,000 to own and work stone quarries and to manufacture cement. The incorporators are E. I. Cox of Chicago, Ill., and M. E. Ochs and R. B. Cook of Davenport.

The Newago Portland Cement Co., Newago, Mich., is constructing a new stone storage building. The Newago company is rushed with orders, but is seriously handicapped by the coal shortage and inability to get cars. Motor trucks are making daily trips between the plant and Muskegon, loaded with cement.

Fairbury, Neb.—Representatives for an Eastern cement company are working among farmers residing four or five miles northwest of Fairbury, soliciting options on 1,000 acres of hilly land which is loaded with lime. The soil has been tested and found to be suitable to make Portland cement. The company finds it necessary to place a Western branch manufacturing plant on account of the prevailing high freights. Options have been taken on 300 acres, and a deal is pending which ties another 700 acre tract.

Gypsum Products

Akron, N. Y.—The Beaver Board interests at Akron, Erie County, which recently acquired the American Cement Plaster Co., and the Bestwall Mfg. Co., is planning a large addition to the plants. Test wells for gypsum have been sunk and the supply found warrants the extension. It is said the supply will be sufficient to last for twenty years.

Shelton H. Dowell, of the Arizona Gypsum Plaster Co., Douglas, Ariz., recently made a trip to Fairbanks, Ariz., to complete arrangements for reopening the sand beds in a wash where the company has been getting sand for building and other purposes for several years. During the rainy season these sand pits fill up with rubbish brought down the wash and this has to be removed down to the sand after the rains cease.

The Connecticut Adamant Plaster Co., New Haven, Conn., manufacturers of gypsum wall plaster whose plant was destroyed by fire in July, will rebuild at once. The new plant is being designed by Richard K. Meade & Co., Consulting Chemical Engineers, 11 E. Fayette Street, Baltimore, Md., and will be of fireproof construction. The buildings will be of steel and concrete and the most improved machinery will be installed. The kettle process will be used and the grinding will be done with Raymond mills. All bins and bunkers will be of steel and the machinery will be driven by individual motors. The plant uses Nova Scotia gypsum which makes the purest and whitest plaster.

The Overland Cement Plaster Co., Laramie, Wyo., has begun the erection of a dirt house, the building to be of wood, 40 by 50 feet, and 42 feet from the ground to the peak of the roof.

The United States Gypsum Co., Chicago, Ill., which recently purchased the Consolidated Cement Plaster Co., of Amboy, Calif., will spend from $50,000 to $60,000 to improve that plant. The Consolidated Pacific Cement Plaster Co. was owned by the Mulvane interests, and the deal for the purchase by the United States Gypsum Co. was recently consummated by A. B. Mulvane, who was the managing director of the company. The price was $187,000. The United States Gypsum Co. also recently purchased the plant of the Arden Plaster Co., at Arden, Nev., and the output of the Amboy plant, it is understood, is to be shipped to the Arden works for refining. The company will supply both building and land cement to cement companies and plants on the Pacific Coast. Workmen are now engaged in improvements at Amboy that will cost between $50,000 and $60,000, and it is the plan to revive extensively the activities at Amboy.

Laramie, Wyo.—The new cement plaster company, formed as the Wyoming Cement Plaster Co., has been notified from the office of Secretary of State that the designation is so like one already in existence as to be contrary to the rules of the office, the company changing its name to the Laramie Cement Plaster Co. The Laramie Cement Plaster Co. will have a capital of $250,000 and the stock is to be subscribed largely by local capitalists. The bed of raw material has been pronounced by geologists and other experts as being of a very high quality. There is a bed of material from 11 to 18 feet in thickness, it having been estimated that it would produce 20 tons per day of finished product for 66 years, so that a good many of those who see the beginning of the enterprise will not witness the exhaustion of the bed, unless the demand far exceeds the present expectations of those engineering the matter. The process will be similar to that employed by the Acme and Oygrland Cement Plaster Companies, and its product will in no way conflict with the sale of the product of those plants.

Sand and Gravel

The Caledonia Sand Co., Racine, Wis., has been incorporated for $6,000 to operate sand and gravel pits by J. C. Wemmert, P. J. Frederickson and C. A. Erickson, all of Racine.

Tullytown Sand & Gravel Co., Philadelphia, Pa., has organized and purchased Charles T. Blackford's sandpit of 20 acres, said to be the finest concrete sand in the neighborhood. Harry Watson, of Fallsington, Pa., is president of the company.

Salt Lake, Utah.—The extensive high grade, white silica deposit north of this city is to be worked by the McDuff Sand & Gravel Co., in which Harold A. Lafount and E. A. Charlton are interested, it is announced. It is stated that an extensive plant is to be erected there, to wash and refine the silica for shipment to California as well as to eastern points. This silica is used in the manufacture of glass, fire and glazed brick, furnace linings, and many other lines. The material is valued at $10 to $100 per ton. Mr. Charlton said this morning that the plant when completed in 60 days would represent an investment of $100,000. The company has been working in the sand and gravel for several months, and has a fine tipple erected. Mr. Charlton believes the silica deposit can not be surpassed by any deposits in the country.

Lime

Cartersville, Ga.—The new lime plant of the Ladd Lime & Stone Co., Cartersville, Ga., was placed in operation September 1st. The present output of the plant is 40 tons of hydrated lime per day. A second unit will be in operation about January 1st, doubling the capacity of the plant. The output of this company has been promptly absorbed by the building trade in the South who have pronounced it the equal of any lime on the market. The plant was built by Richard K. Meade & Co., Consulting Engineers, Baltimore, Md., and a description of this plant will appear very shortly in this magazine.

The Pioneer Lime & Mfg. Co., Sedan, Kans., has recently been dissolved. This company was organized along about 1905 for the purpose of dealing in limestone and limestone products.

The Bone Dry Lime Corp., located about ¾ of a mile south of Cassadaga, N. Y., had its plant destroyed by fire on Sept. 28, with a loss roughly estimated at $100,000. About $80,000 insurance was carried on the property. The fire was discovered at 10:30 o'clock in the roof of the east end of the building and within a little more than an hour the building was in ruins. The fire, it is supposed, was started by sparks from an engine, at least this is the theory of President Smith. The plant is located along the tracks of the Valley Branch of the New York Central line. The entire plant including machinery was destroyed, the building burning to the ground. Two cars loaded with lime, standing on a siding near the factory, also were destroyed. The building was 300 feet long and 75 feet wide and of frame construction. The manufacturing building was only completed within the last year and a big storehouse was just about finished. The Bone Dry Lime Corp. is a comparatively new concern engaged in the manufacture of lime from deposits found in the vicinity of its plant. Charles E. Smith of Fredonia, is its president and Harry Vickery, the superintendent. President Smith said this afternoon that the work of rebuilding the plant would be started at once. The plant employs about twenty men and has been doing a prosperous business. The demand for the product has been so great that the plant was behind in its orders and for this reason there was practically no loss on the finished product, as it was shipped as fast as finished.

Phosphate

The Virginia-Carolina Chemical Co., makes the following financial statement to its stockholders: "You are hereby notified that pursuant to the provisions of Article 6 of the trust agreement dated May 15, 1914, between the Virginia-Carolina Chemical Co. and The Equitable Trust Co. of New York as Trustee the undersigned company intends to redeem all of the debenture scrip outstanding under said agreement on Oct. 15, 1920. The holders of debenture scrip are required to present said debenture scrip at the office of The Equitable Trust Co. of New York, No. 37 Wall Street, New York City, on Oct. 15, 1920, and the company will redeem such debenture scrip on that date at 102 and accrued interest. Interest on the debenture scrip will cease to accrue on Oct. 15, 1920. Income Tax Ownership Certificates will be required with respect to the accrued interest."

The Carolina Fertilizer and Phosphate Co., Raleigh, N. C., has been incorporated for $2,000,000, and will establish a plant immediately.

The Seminole Phosphate Co., Bartow, Fla., contemplates developing phosphate plant. They intend installing mining machinery, including washers and dry-bins. A. L. Wrigh, of Croom, Fla., is the engineer in charge.

The Suffolk Fertilizer Co., Suffolk, Va., has been incorporated for $250,000 by R. L. Bremer, Jr., Pres.; Wm. Jones, Secy-Treas.; A. K. Roe, Mgr. The company will erect a 2-story 200x100 ft. building and will install a dry mixing plant.

Personals

John Ruhm, Jr., vice-president, treasurer and general manager of the Ruhm Phosphate Mining Co., Mt. Pleasant, Tenn., has recovered from his recent illness, having returned from a sojourn in New Hampshire to Mt. Pleasant again.

Albert Courchesne, son of A. Courchesne, president of the El Paso Limestone Quarries, El Paso, Tex., is down in Panama working for Goethals, Wilford and Boyd, a large mercantile concern, with headquarters in New York, of which Gen. Goethals is president.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

Of Rock Products, published every other week at Chicago, Ill., for October, 1920.

State of Illinois, County of Cook—ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Geo. P. Miller, who, having been duly sworn according to law, deposes and says that he is the business manager of Rock Products, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Tradepress Publishing Corporation, Chicago. Editor, N. C. Rockwood, Chicago. Managing Editor, N. C. Rockwood, Chicago. Business Manager, Geo. P. Miller.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.) W. D. Callender, Chicago; T. J. Sullivan, Chicago; Geo. P. Miller, Chicago; N. C. Rockwood, Chicago; H. P. Sessions, Chicago; D. R. Hicks, Chicago; C. H. Fuller, New York; H. J. Wolfe, Chicago; C. O. Nelson, Chicago; Wm. B. Mayor, Chicago; A. H. McQuilkin, Chicago; W. G. Paulson, Chicago.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If ethre are none, so state.) There are none.

4. That the two paragraphs next above, giving the names of owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is .....

(This information is required from daily publications only.)

GEO. P. MILLER,
Business Manager.

Sworn to and subscribed before me this 24th day of September, 1920.

(Seal) FRANK L. CHENEY, Notary Public.

(My commission expires Dec. 21, 1921.)

Form 3526—Ed. 1916.

CLASSIFIED ADVERTISING

Rates for advertising in the Classified Department: $2.50 per column inch per insertion. Minimum charge, $2.50. Please send check with your order. These ads must be paid in advance of insertion.

Plants for Sale

FOR SALE

257 acres of land, underlaid with fine quality limestone suitable for high-grade hydrated lime, agricultural limestone, flux, etc. Water running through property. Located near Warwick, New York. Close to railroad.

Fuller-Lehigh Company
Fullerton, Pa.

Situations Wanted

Position Wanted

Superintendent desires engagement. Thoroughly familiar with all details of crushing or sand plants, steam shovel operations and where heavy tonnage is desired. Have good organization of efficient labor available. A 1 references. Address

Box 1430 **Care Rock Products**

Situations Wanted

For Several Years

I have had a constantly increasing business with the leading mason material dealers in Greater New York and vicinity and am now in position to market standard accessories or specialties to this trade. If you wish the right kind of representation in this market on straight commission basis with bills guaranteed, communicate with

CIVIL ENGINEER
Room 514, 220 W. 42nd St., New York

Help Wanted

WANTED

Master mechanic for Lime and Stone operation. Must be able to keep all machinery, steam shovels, locomotives, crushers, etc., in good running order and be proficient in using acetylene welding outfit. State age and experience and give references. Address

Box 1436 **Care Rock Products**

Help Wanted

WANTED

Man thoroughly capable of running a lime burning and crushing plant in Massachusetts. Apply, with particulars, to

Box 1439 **Care of Rock Products**

WANTED

Field Engineer between 30 and 40 years old, familiar with Cement and Plaster Mill Conveyor Installations.

BATES VALVE BAG CO.
7310 South Chicago Avenue, Chicago, Illinois

WANTED

Engineer capable of handling small Ingersoll Rock Chanelling machine. Wire

Siems, Helmers & Schaffner,
514 Guardian Life Bldg. **St. Paul, Minnesota**

USED EQUIPMENT

Rates for advertising in the Used Equipment Department: $2.50 per column inch per insertion. Minimum charge, $2.50. Please send check with your order. These ads must be paid in advance of insertion.

WE BUY—REBUILD—SELL or RENT

All the equipment listed below is owned by us and may be inspected in one of our own warehouses

CARS

24—1½ yard V shape 24" gauge Kopple cars, practically brand new; used less than one month.
12—Same as above with brakes.
12—1 yard V shape 24" gauge Kopple cars, excellent condition.
2—End dump Kopple cars, 18 cu. ft. capacity, 24" gauge.
2—Kopple 3'x5' flat cars, 24" gauge.
1—Kopple 24" gauge hand car.

CLAMSHELL BUCKETS

1—½ yard Standard.
6—¾ yard buckets following makes; Obenberger, Aden, Standard. Owen.
9—One yard buckets, following makes:
1 Owen, type L.
2 Owen, type E, one with teeth, one without teeth.
1 Heyward.
1 Mead Morrison.
2 O. & S.
1 Standard
1 Kiesler
2—Heyward, 1¼ yard.
2—Heyward Orange Peel, capacity ¾ yard.
1—Heyward Orange Peel, capacity 1 yard.

BOILERS

1—150 horse power locomotive type.
1— 75 horse power locomotive type.
1— 50 horse power locomotive type.
1— 25 horse power locomotive type.
21—Small Vertical Boilers from 6 H.P. to 12 H.P.

CRANES

1—12½ ton, 4 wheel Browning Locomotive Crane with 40 ft. boom, bucket operating, just like new.
2—15 ton, 4 wheel O. & S. Locomotive Crane with 40 ft. boom, bucket operating.
2—Byers Auto Cranes on traction wheels with 30 ft. boom, with or without buckets.

HOISTS

1—10x12 D/C 3 drum Lidgerwood with boiler.
1—9x10 D/C D/D Lidgerwood with boiler with 4 Independent clutch winch heads.
1—10x12 D/C D/D Lidgerwood skeleton.
10—8¼x10 D/C D/D with boiler, following makes: American, Lidgerwood, Clyde, Lambert, Flory, Reliance, Mundy and National.
55—Hoists, from 7x10 to 4¼x6, all makes.

LOCOMOTIVES

2—Davenport 24" gauge, 7½ ton saddle tank.
1—Vulcan 9x14, 36" gauge saddle tank.
1—Porter, 18 ton, saddle tank, 36" gauge.

PUMPS

1—Morris Centrifugal, 10 in. suction, 10 in. discharge, direct connected steam engine.
2—Morris Centrifugal Pumps, 6" suction, 5 in. discharge, direct connected steam engine.
1—Fairbanks-Morse Centrifugal 5" suction, belt driven.
5—Domestic Force Pump, 3 H.P. gas engine.

The above is only a partial list of our enormous stocks—we have Concrete Mixers, Derricks, Rollers, Pavers, Rail and Track, Steam Shovels, etc.

EQUIPMENT CORPORATION OF AMERICA

Chicago, 1419 Lumber Exchange Bldg.

Philadelphia: Land Title Bldg. **Pittsburgh: Empire Bldg.**

Machinery For Sale

DRYERS—Direct-heat rotary dryers, 3x25 ft., 3½x25 ft., 4x30 ft., 5x35 ft., 5½x50 ft., 6x50 ft., and 7x60 ft.; double shell dryers, 4x20 ft., 5x30 ft., and 6x35 ft.; steam-heated air rotary dryers, 4x30 ft., and 6x30 ft.

KILNS—Rotary kilns 8x60 ft., 6x60 ft., 3½x25 ft., and 8x25 ft.

MILLS—24-in., 22-in., and 16-in., Schutz-O'Neill mills; 8x8-ft., 6x5-ft., 2½x3-ft., 3x3½-ft. pebble mills; 6x6-ft., 5x4-ft., 4½x3½-ft., 2½x2½-ft. ball mills; 3-ft. Marcy mill; 42-in., 38-in. and 24-in. Fuller-Lehigh mills; 4½x20-ft., 5x11-ft., 5x22-ft. and 6x20-ft. tube mills; 7½x13-in., 9x15-in., 13x24-in., 16x10-in., 20x6-in. and 30x60-in. jaw crushers; one "Infant" No. 00, No. 0, No. 2, No. 3 and No. 9 Williams' swing hammer mills; one Kent type "G" mill; one Aero pulverizer, type "D"; 24-in., 36-in. and 40-in. cage mills; 3-ft. and 4½-ft. Hardinge mills; 18x12-in., 20x12-in. and 30x10-in. roll crushers; No. 0, No. 1 and No. 3 Sturtevant rotary crushers; one No. 2 Sturtevant ring roll crusher; 3-roll and No. 0000 Raymond mills; one No. 6 Telesmith breaker; one 36-in. Sturtevant emery mill; four Giant Griffin mills; one Junior Griffin mill; one 51x14-in. chaser mill.

SPECIALS—Emerick 8-ft. separator; one McDougal and one Wedge mechanical furnaces; five automatic package weighing machines; electric arc furnaces; jigs; one Keystone excavator; 6x8-ft., 6x5-ft. and 4x3-ft. Newaygo vibrating screens.

Air compressors and tanks.

All this equipment is complete and in good condition.

W. P. HEINEKEN, Engineer,
95 Liberty Street, New York. Tel. Cortl. 1841

Real Bargains

All at storage yard at Jersey City, N. J.

AIR COMPRESSOR—Vulcan double slide valve type, 20-inch diameter steam and air cylinders, 30-inch stroke, 12-foot fly wheel. Myer cut off type of valve gearing. Capacity 1936 cubic feet of free air per minute. Normal speed 90 R.P.M. Steam pressure 100 pounds. Air pressure 80 to 100 pounds. Built in 1907 by the Vulcan Iron Works, Wilkes-Barre, Pa. Used only four years and in one Power House.

CORLISS ENGINE—Built by Wisconsin Engine Company. Size 16 x 36 inches. Girder frame. Right hand. Two belt wheels, one 10' diameter by 36½" face, one 9' 6½" diameter by 20½" face. Bought new in 1907. Used 2½ years.

PLANER—Size, 24"x23"x6' 2"; built by Lathe & Morse Tool Company, Worcester, Mass. Table 20" wide by 7' 2" long.

CONVEYOR—Jeffrey Mfg. Co. Conveyor, Pulleys, etc., including two 30" belts, one 330 feet long, one 395 feet long, rubber covered.

ROCK DRILLS—Six Murphy Rock Drills, 3⅝" cylinder, 8" stroke, with tripods and weights; $50 each.

WATER HEATER—One Wickes Open Water Heater, 1,000 gallons capacity, 8- and 10-inch connections.

MISCELLANEOUS—8 Reels Galvanized Guy Lines; 3 Coils Guy Lines; 3 Quarry Chains, 20' long; 1 Quarry Chain, 24' long; 2 36"x12" Face-Pulleys; 2 32"x24" Pulleys; 1 Buffalo Cutter; 1 Hains Gravity Concrete Mixer; 9 Pulleys, misc.; 1 Derrick, block foot casting; 1 Hand Truck; 3 Drill Columns, 5½x7.

If you can use any of the above, prices will be made satisfactory to you, after inspection.

E. C. SHERWOOD
50 CHURCH STREET NEW YORK

Shovels, Locomotives, Cars and Cranes

Bucyrus, 40-ton, 1½ yard.
Bucyrus, 70-ton, 2½ yard.
Osgood Model 18, Traction, ¾ yard.
Marion Model 28, Traction, ⅞ yard.
Thew Model 0, Traction, ¾ yard.

LOCOMOTIVES

American, 30-ton Std. Gauge Saddle Tank.
Baldwin, 35-ton Std. Gauge Saddle Tank.

CARS

10 Western 12-yd. Std. Gauge.
48 Kopple 1½-yd. 24 Gauge, Illinois Delivery.

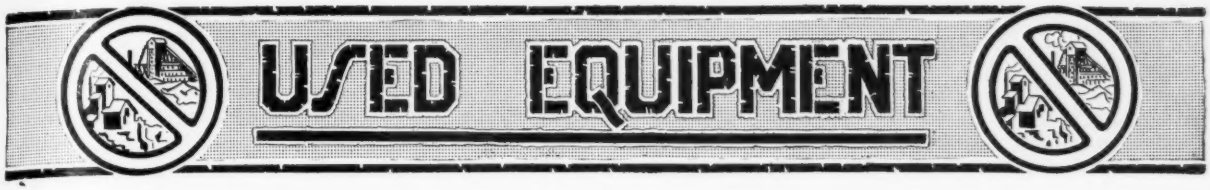
LOCOMOTIVE CRANES

Osgood Model 29, Std. Gauge.

Clam Shell, Orange Peel, and Drag Line Buckets

Blaw Knox, one and two yds. Cap. Clam Shells.
Owen, 1¾ yds. Cap. Clam Shells.
Williams, 2 yds. Cap. Clam Shells.
Smith, ¾ yd. Cap. Orange Peel.
Hayward, 1 yd. Cap. Drag Line.
Page, 1 yd. Cap. Drag Line.
Some of the above items are new.

A. J. O'NEILL CO.
Weightman Bldg. Philadelphia, Pa.



Repaired Contractors' Equipment

Steam Shovels

Model 60 Marion Shovels, 2½-yard dippers, Nos. 1999, 2059, 2130

1—Model 1 Thew, on railroad trucks, ⅞-yard dipper.

1—Bucyrus Model 70-C, Shop No. 1219.

We have a large stock of thoroughly repaired Construction Equipment of all kinds ready for immediate shipment.

Locomotives

8—18-ton, 10x16" Porter Dinkeys, 36" gauge.
2—12-ton, 9x14" Porter Dinkeys, 36" gauge.
1—17x24", 55-ton, 4-6-0, standard gauge.
3—25-ton Forney type.

Clam Shell Buckets

1—1¼-yard Williams Hercules Bucket.

Cars

30—Western Air Dump 12-yard, standard gauge.
40—Western 4-yard, 36" gauge, steel beam.

H. KLEINHANS COMPANY

Union Arcade **Pittsburgh, Pa.**

WANTED

One two-way travelling electric crane, overhead, on stationary towers, or travelling towers on ground rails, with or without tower structure. Capacity from eight to fifteen ton; state general condition and lowest price. Travelling monorail overhead on towers, with or without structure. Capacity five to fifteen tons, electric. State general condition and lowest price.

NATIONAL CEMENT CO.
RAGLAND, ALA.

FOR SALE

Complete Ground Limestone Crushing Plant with Sturtevant Mill, Screens, Conveyors, etc.

EMPIRE LIMESTONE CO.
BUFFALO, N. Y.

FOR SALE

2 13-ton Standard Gauge Whitcomb gasoline locomotives. Also have two steam driven air compressors, 365-ft. and 900-ft. capacity. Would like to exchange for electric driven compressor, of about 400-ft. capacity, driven by 440 volt motor.

The Casparis Stone Co.
Columbus, O.

WANTED TO BUY

60 H.P. Electric Motor, new or second-hand in good condition, to run air compressor for quarry.

Fall River Granite & Quarry Co.
Fall River, Mass.

IMMEDIATE DELIVERY

2—150 H.P. 125 lbs. HRT. Boilers, Butt strap.
4—No. 6 Gates (Man. Fit.) nickel steel shafts.
1—No. 7½ and 1 No. 8 Gates, Reg. drive.
No. 4 Telsmith plant, AC. motor drive.
Air Compressors (Steam, Belt), 50 to 4000 ft.
40 Boilers, 60-150 HP. 100-130 lbs.
1—30-60 Emerson Brantingham tractor.
1—18-ton Gallon loader and bin.
4 NEW No. 4 Gates, Mang. Fit. $2000 each.
10 coils Roebling ⅝-in. traction cable (used).
3 Bag Koehring paver, practically new.
1½-yd. Nagley Slack lined bucket equip.
900 ft. 1¾-in. NEW Roebling steel cable.
Type "O" ¾-yd. Thew steam shovel.
50—25-20-15 and 125 Kw. eng. and turbo sets.
1—42"x16" Traylor Roll Crusher.
2—156 Kva. 240 v. 60 cy. 3 ph. eng. sets.
Send us your inquiries. Pumps, steam and elec. equip., etc.

ROSS POWER EQUIP. CO.
INDIANAPOLIS, IND.

New—RAILS—Relaying

All sections on hand for quick shipment. Reasonable prices quoted. Our stock is very complete.

M. K. FRANK
Frick Building **Pittsburgh, Pa.**

USED EQUIPMENT

EQUIPMENT

STEAM SHOVELS

2—⅝ yd. Thew "O" Traction. Mass. boiler.

LOCOMOTIVES

2— 3 ton Std. gage Plymouth gasoline.
6—14 ton 36 in. gage Vulcan saddle tanks.
2—14 ton 36 in. gage Porter saddle tanks.
2—18 ton 36 in. gage Davenport saddle tanks.
1—21 ton 36 in. gage American saddle tank.
1—30 ton Std. gage Pittsburgh O-4-O saddle tank.

DUMP CARS

6—24 in. gage 1½ yd. Western 2 way.
35—24 in. gage 1 yd. Koppel 1 way.
8—30 in. gage 1½ yd. all steel quarry, end dump.
6—36 in. gage Koppel 3 yd. V shape, 2 way.
15—36 in. gage 4 yd. Western 2 way.
12—36 in. gage 4 yd. Continental 2 way.

ZELNICKER IN ST. LOUIS

Get our New Big Bulletin 285 for unusual Bargains in Railway, Power Plant and Contractors' Equipment, Dump Cars, Track Accessories, Tanks, Pipe, etc.

What have you for sale?

FOR RENT

Two 3½-ton dump trucks suitable for gravel hauling. Starting November first.

BOOTH & OLSON
Sioux City, Ia.

AIR COMPRESSOR

Ingersoll-Rand Imperial Type 10 Steam Driven, capacity 599 ft. Practically new condition. Also other sizes.

Mid-Continent Equipment & Machinery Co.
Security Bldg., St. Louis, Mo.

NO. 7½ AUSTIN GYRATORY CRUSHER

Standard Drive

Complete with elevator and revolving screens. Condition excellent. Also

No. 5 Austin, standard drive, with 30-ft. elevator. Condition excellent.

Both plants thoroughly rebuilt, and can be shipped promptly. We also have many other bargains. Write us fully.

Reading Engineering Co., Inc.
1227 Tribune Bldg. New York, N. Y.

LOCOMOTIVES

2—50-ton 18x24-in. six-wheel switchers.
3—24-ton 12x18-in. six driver 36-in. gauge. Porters (new) with tenders.
2—18-ton and 14-ton 36-in. gauge Vulcans.
2—10-ton 7x12-in. 36-in. gauge Vulcans.
1—10-ton 36-in. gauge Shay geared.

MISCELLANEOUS

1—Marion 76 steam shovel, No. 3503.
1—Bucyrus dragline, 100-ft. boom, 3½-yd. bucket.
100—60,000-lb. capacity box cars, 40-ft. long.
20—6-yd. dump cars, 4-ft. 8½-in. gauge.
12—1½-yd. "V" steel dump cars, 36-in. gauge.
1—Western standard gauge spreader.
1½-yd. clamshell bucket, 10-hp. and 45-hp. upright boilers, 2-in., 4-in. and 6-in. simple, duplex and centrifugal pumps, tripod drills, etc.
Railway equipment, etc.

INDUSTRIAL EQUIPMENT CO.
McCormick Building Chicago, Ill.

FOR SALE

2—No. 18 Gates K Gyratory Crushers with elevators and screen; complete; first class; immediate delivery. Also twenty other sizes.

J. F. DONAHOO CO.
Birmingham, Ala.

FOR SALE

4—6 ft. Whip-Tap Screens, made by The W. S. Tyler Co.; very little used and in good condition.
2—8 ft. Newaygo Screens, used about 4 years.

RUHM PHOSPHATE MINING CO.
Mt. Pleasant Tennessee

WANTED

1—30-in. Belt Conveyor, 247 ft. long, center to center pulley.
1—30-in. Belt Conveyor, 350 ft. long, center to center pulley.
1—24-in. Belt Conveyor, 350 ft long, center to center pulley.
1—30-in. Belt Conveyor Tripper with or without Belts.

Troughing rolls for each belt, 5 ft. centers.

Return rolls for each belt, 10 ft. centers including drive gearing for each belt.

Give full description including ply of belting.

NATIONAL CEMENT CO.
RAGLAND, ALA.

Do You Care to Save?
Try Us for Good Used

Crushers
Cranes—Cars
Locomotives—Rail
and all kinds of
Quarry Equipment

Reading Engineering Co., Inc.
154 Nassau St. New York

For 48 pages of unusually good bargains in

CRUSHERS

Compressors, Boilers, Hoists, Rails, Cars, Locomotives, Quarry Equipment, etc.
Write for our Latest Big Bulletin.

ZELNICKER in ST. LOUIS

WANTED

Second-Hand Hydrator and Raymond Air Separator for Small Plant.

PALMER LIME & CEMENT CO.
103 Park Avenue, New York City

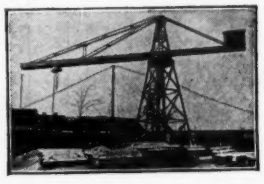
When in the market for machinery or equipment, look through the advertisements of ROCK PRODUCTS. If you do not find what you want advertised in this issue, write us and we will put you in touch with reliable firms who can supply your need. This service is free to our readers. Use it.

Rock Products

The Nation's Business Magazine of the Rock Products Industry

542 So. Dearborn St. Chicago, Illinois

Locomotive Cranes



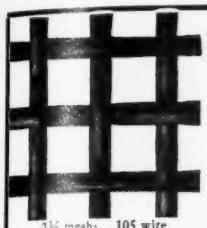
Special Cranes

Rotating Tower Cranes

Any Size or Capacity. Hand or Electrically Operated.
Stationary or Traveling.

Let Us Know Your Requirements

The American Crane & Engineering Co.
Toledo, Ohio



EVERY STEP

In the manufacture of

"Cleveland" Double Crimped Wire Cloth

is taken with one definite end in view

Service

A uniform fineness is assured by its use

2½ mesh; .105 wire

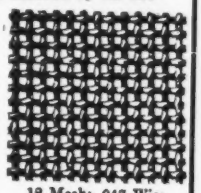
Unequalled for the screening of

Sand, Gravel, Crushed Stone and Cement

A large stock always on hand. However, any special mesh will be manufactured to suit requirements. PRICES RIGHT.

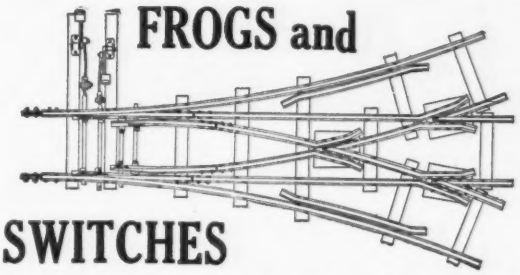
The Cleveland Wire Cloth and Manufacturing Co.

3573 E. 78th Street, Cleveland, Ohio



1¾ Mesh; .047 Wire

FROGS and SWITCHES



The Central Frog & Switch Co., Cincinnati, O.

Frogs, Switches, Crossings, Switch Stands, Rails, Angle Bars, Fishplates, Throws, Rail Braces, Tie Plates, Portable Track, Etc., Etc.

The Baldwin Locomotive Works

Philadelphia, Pa.

Steam and Gasoline LOCOMOTIVES

for

Industrial Service

"Hercules Solid Weld" Steam Shovel Chains

Best In the World. Will Actually Wear Out

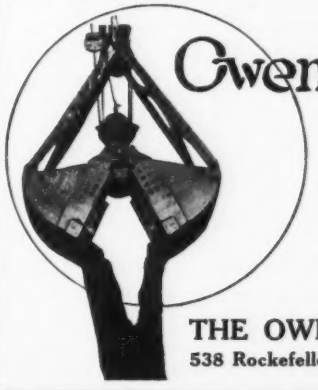
The Columbus McKinnon Chain Company
Columbus, Ohio

TERRY FULL CIRCLE CRANES

FULL CIRCLE CRANES. "EQUIPMENT THAT LASTS." TIMBER & STEEL DERRICKS.

LET US SOLVE YOUR MATERIAL HANDLING PROBLEMS.

Steel and Timber DERRICKS **TERRY**



Owen Buckets

combine dollar-saving features of bucket construction which are illustrated in our latest catalogue.

Write for it today.

THE OWEN BUCKET CO.
538 Rockefeller Bldg., Cleveland, Ohio

SCREENS of All Kinds

Chicago Perforating Co.
2445 West 24th Place
Tel. Canal 1459 **CHICAGO, ILL.**

BACON-FARREL ORE & ROCK CRUSHING-WORLD KNOWN ROLLS-CRUSHERS

EARLE C. BACON, INC. ENGINEERS
26 CORTLANDT ST., NEW YORK

J. C. BUCKBEE COMPANY
ENGINEERS
BUILDERS OF CEMENT PLANTS
FIRST NATIONAL BANK BUILDING
CHICAGO, U. S. A.

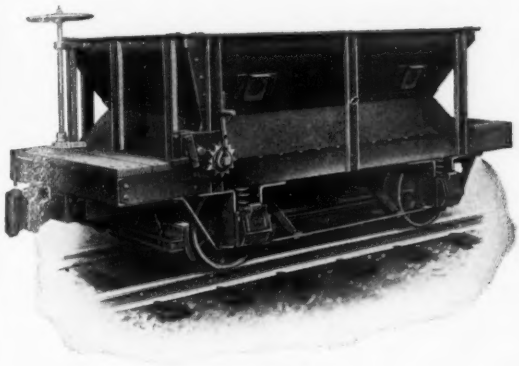
Geo. B. Massey Company
Consulting Engineers
EXCAVATION
Opening up and economical development of stone quarries, sand, gravel and clay deposits.
Hydraulicking. Stripping.
Centrifugal pumping and hydraulic dredges.
Most suitable machinery and methods to insure lowest costs.
Design and construction of complete plants.
Engineering supervision.
Inspection of new and second hand machinery.
Booklet on excavating machinery on request
Peoples Gas Building, Chicago

Robert W. Hunt Jno. J. Cone Jas. C. Hallsted D. W. McNaugher
ROBERT W. HUNT & CO.
Inspection—Tests—Consultation
Inspection New and Second Hand Machinery, Pumps, Crushers, Steam Shovels, Cars, Locomotives, Rails and Quarry and Contractors' Equipment
INSPECTION AND TESTS OF SAND, GRAVEL, CEMENT, STRUCTURAL STEEL, CASTINGS AND CONSTRUCTION MATERIALS
Cement, Chemical and Physical Testing Laboratories
New York St. Louis CHICAGO Kansas City Cincinnati Pittsburgh San Francisco

James N. Hatch, C. E., M. E.
Member A. S. C. E.
CONSULTING ENGINEER
500 Old Colony Bldg., Chicago
Designs and Constructs
Complete Sand and Gravel Screening and Washing Plants.
Stone Crushing and Storage Plants. Conveying Systems. Contractors' Material Plants
Electric Generating Plants and Transmission Lines.
Estimates and Plans Furnished

We Design and Equip Complete Plants
for the manufacture of gypsum products, such as wall plaster, moulding plaster, wall board products, gypsum block products, also mixing plants.
We are prepared to furnish complete machinery-equipment and design and furnish plans for the installation. Consult our Engineering Department. Forty years' experience in designing of wall plaster machinery and plants.
The J. B. Ehrsam & Sons Mfg. Co.
Engineers, Machinists and Founders
Enterprise, Kansas

The House of Dependable Service
HYMAN-MICHAELS COMPANY
Peoples Gas Building
CHICAGO
NEW AND RELAYING RAILS
BRANCH OFFICES
New York, N. Y. 1324 Woolworth Bldg.
Pittsburgh, Pa. 1313 1st National Bank Bldg.
St. Louis, Mo. 2115 Railway Exchange Bldg.



No. 138-R

WATT CARS

We have devoted years to the study of cars for your requirements, and now offer free our engineers' expert judgment in solving your problems.

CARS—every type—that's all we make.

The Watt Mining Car Wheel Co.
Barnesville, Ohio

Many Notable Improvements Characterize THE "American" Gearless Blast-Hole Drill

While the normal speed of drilling is 50 strokes a minute, this machine will jump the tools smoothly at 60 strokes, handling with ease a 4-in. diameter by 20-ft. length drill stem equipped with bit and socket weighing from 1100 to 1200 lbs. and drilling 5⅜-in. or 6-in. holes.

The spudding beam is attached to the crank in such manner that it gives a quick, hard stroke of drill at a speed of 50 or 60 r. p. m., with a minimum of whipping of cable.

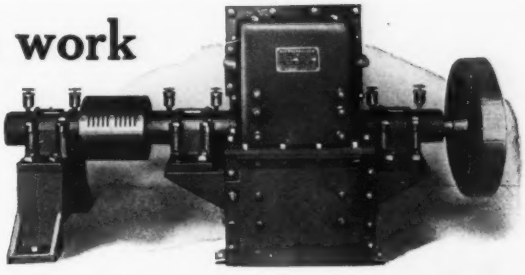
No clutches on the machine; the crank is keyed fast to the crank shaft, and the tools are always the full length of the stroke off the bottom when stopping, permitting them to start on the down stroke with engine or motor at full speed without backing up.

Description on Request

The American Well Works Aurora, Illinois

By the very nature of the work

it is called upon to perform a pulverizer must be much stronger than the material it handles.



Only STEEL will stand the stress

"K-B" is built ALL-Steel

Catalog with full particulars on request

K-B PULVERIZER COMPANY, Inc., 92 Lafayette St. NEW YORK

K-B PULVERIZER

PORTER LOCOMOTIVES

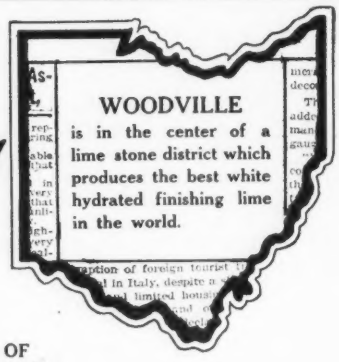
STEAM & COMPRESSED AIR
WRITE FOR CATALOGUE
H.K. PORTER Co.
Pittsburgh, Pa.

WHY? — WOOD DRILLS

Because They—
- Drill faster
- Stand more abuse
- Need less repairs
- Thrive on hard work

Men who know, prefer "WOOD DRILLS" Because they fill the bill and cut the cost.

Wood Drill Works
30-36 Dale Ave. **Paterson, N. J.**



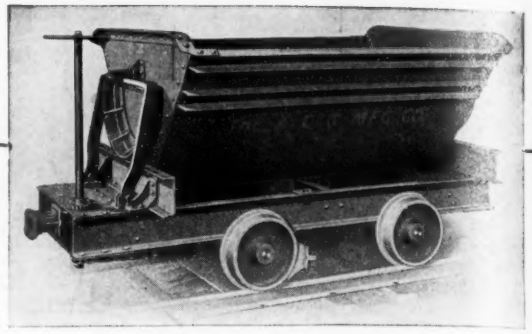
BUILDERS OF
THE "ARNOLD"
LIME KILN AND
LINING

LOCATED
IN THIS DISTRICT

ARNOLD & WEIGEL

CONTRACTORS AND ENGINEERS

WOODVILLE, OHIO



More Than Reinforced

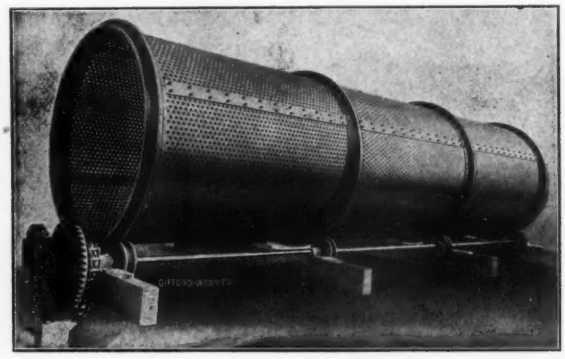
Reinforcing a dump car makes it stronger, of course. But there is a best way to reinforce. Atlas cars are reinforced the best way. Why? Simply because we have built dump cars so long and for so many people that we know just where the reinforcing should go and just how it should be done.

Not much wonder, then, that Atlas dump cars stand the "gaff" better than the average.

The Atlas Car & Manufacturing Co.

ENGINEERS MANUFACTURERS

CLEVELAND, OHIO, U. S. A.



Screens of All Kinds
Also Conveying Machinery

for handling Crushed Stone, Gravel, Sand, Clinker and like materials.

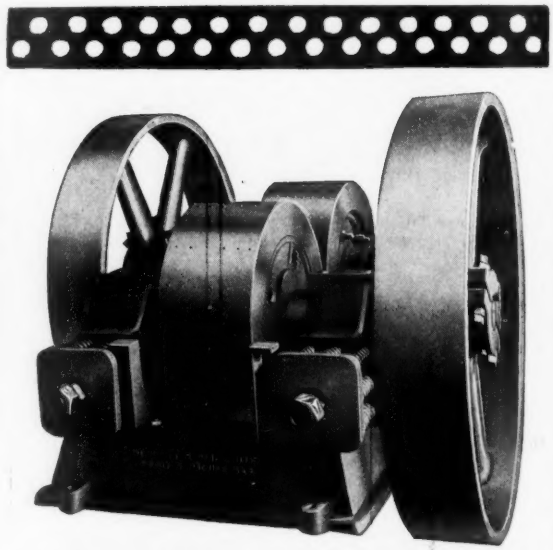
You are invited to ask our cooperation at any time—preferably RIGHT NOW! Just sketch your problem briefly and you shall have a money-saving plan submitted you at once.

Catalogs mailed on request

Gifford-Wood Co.

HUDSON, N. Y.

New York Buffalo Chicago
Boston Philadelphia

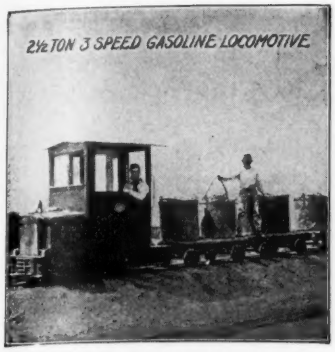


TRANSMISSION EQUIPMENT, SCREENS ELEVATOR BUCKETS, CRUSHERS

Write for descriptive literature

WEBB CITY & CARTERVILLE FOUNDRY & MACHINE WORKS

WEBB CITY, MISSOURI



GEAR AND FRICTION DRIVEN GASOLINE LOCOMOTIVES—2½ TO 25 TONS ON DRIVE WHEEL

WHITCOMB LOCOMOTIVES

IT WILL PAY YOU TO GET OUR PROPOSITION BEFORE YOU BUY

GEO. D. WHITCOMB CO.

MAIN OFFICE AND WORKS

ROCHELLE, ILLINOIS
U. S. A.

STORAGE BATTERY LOCOMOTIVES—1 TO 8 TONS ON DRIVE WHEELS

CROSS ENGINEERING CO. CARBONDALE, PA. PERFORATED SHEET METALS

PERFORATED STEEL SCREENS

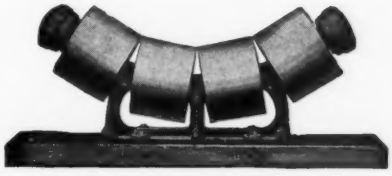
The success of any house supplying repair and renewal parts depends on furnishing what is needed quickly and correctly, and of satisfactory quality.

Sixteen years in the Perforated Metal field have given us the experience, equipment and technical knowledge, and three hundred tons or more of Steel Plates and Sheets enable us to fill rush orders promptly.

Try us with your next order.

Cross Engineering Company, Offices and Works, Carbondale, Pennsylvania

---



CALDWELL Belt Conveyors

Simple—Economical

will solve your handling problem. Simple in design, economical of power, they give the utmost satisfaction. Our forty years' experience has made us thoroughly familiar with the many details of construction necessary to success.

A rough sketch showing the conditions to be met at your plant will bring our recommendations. We should also know the capacity desired and the power available.

Get Catalog No. 38

H. W. Caldwell & Son Co.

Elevating, Conveying and Power Transmitting Machinery

Chicago 17th Street and Western Avenue

50 Church Street New York, N. Y.

SAUERMAN DRAGLINE CABLEWAY EXCAVATORS
dig, convey, elevate and dump in one continuous movement under entire control of one man

The 4 Plants of McGrath Sand & Gravel Co. are all equipped with SAUERMAN DRAGLINE CABLEWAYS

At Forreston, Ill., the McGrath Sand & Gravel Co. recently placed in operation their fourth sand and gravel plant.

This newest McGrath plant, like their three other plants at Mackinaw, Ill.; Chillicothe, Ill., and Pekin, Ill., is equipped with a Sauerman Dragline Cableway Excavator.

The case of the McGrath Sand & Gravel Co. and of many other sand and gravel producers from whom we have received repeat orders, is the best evidence as to the successful performance and reliability of Sauerman Dragline Cableway Excavators.

The cost of installing and operating our type of equipment is moderate, and the small capacity outfits are as economical for the owner of a gravel pit serving a local trade as the larger outfits are for the producer who is covering a big territory and shipping gravel by the trainload.

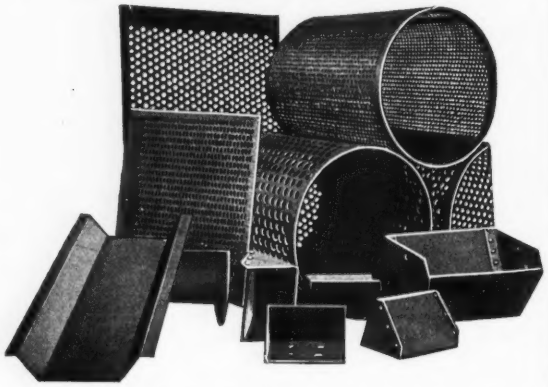
If you want to know whether a dragline cableway excavator would be suitable for your particular proposition, give us an idea of your requirements and we will submit our recommendations.

SAUERMAN BROS.
1140 Monadnock Block, Chicago

Perforated Metal Screens

FOR

Stone, Gravel, Sand, Etc.



ELEVATOR BUCKETS

PLAIN AND PERFORATED

General Sheet and Light Structural Work

Hendrick Mfg. Co.

CARBONDALE, PA.

New York Office, 30 Church Street

LOCOMOTIVE CRANES
CLAM SHELL BUCKETS - SHIPBUILDING CRANES
CAR DUMPERS PILE DRIVERS
THE McMYLER INTERSTATE CO.
CLEVELAND OHIO

A CRANE WITH A RECORD FOR SPEED

A McMyler Interstate Type "B" Crane, equipped with a McMyler Interstate Clam-Shell Bucket, made a record of 13 trips in 3 minutes, swinging at 90° each trip. The speed is important, but the fact that the crane will stand up under continuous service such as this is more important. The first cost of a crane is of little importance if a large percentage of return is insured. Greater speed, consequent greater capacity, together with low maintenance cost, make the Type "B" one of the best "buys" on the market.

The McMyler Interstate Co., Cleveland, O.

BRANCH OFFICES:

New York—1756 Hudson Terminal Bldg. Seattle—Hoge Bldg.
San Francisco—Merchants Exchange Bldg. Denver—18th and Wazee Streets
Chicago—812 Edison Bldg.

Note These Please!

Points of superior merit guarantee economical operation of the Fuller Lehigh

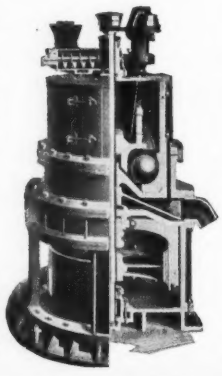
Pulverizer Mill

They are unequalled for producing

Agricultural Limestone

Reduces lump rock to 20, 40, 60, 80, 100 or 200 mesh. Requires no outside accessory equipment. Requires no overhead shafts, drives or screens. All material discharged from mill is finished product. No inside journals or bearings. No inside lubrication. Uniform feeding system. Constant and free discharge. Low installation cost. Low operating cost. Low lubricating cost. Dustless operation. Built in sizes to meet the requirements of your trade. Grinds rock to meet the specifications of all Agricultural Experiment Stations.

Send for Catalog No. 70



Fuller-Lehigh Company

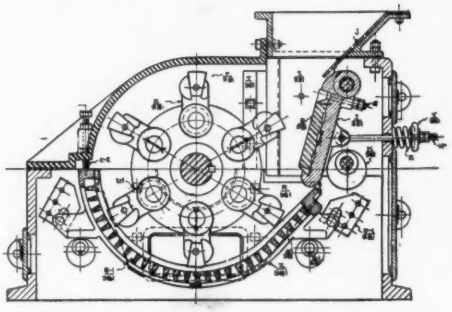
MAIN OFFICE AND WORKS:

Fullerton, Penna., U. S. A.

Branches: New York City, 50 Church St. First National Bank Bldg., Parsons, Kans. 719 Sheldon Building, San Francisco 714 L. C. Smith Building, Seattle, Wash. 1338 McCormick Building, Chicago, Ill. 25 Victoria St., Westminster, S. W. 1., London, England. Germany, Hamburg, 1, "Wallhof." Glockengiesserwall 2.

THE KENNEDY

Swing-Hammer Pulverizer



A Mechanically Perfect Device

The Kennedy Swing-Hammer Pulverizer embodies mechanical improvements heretofore considered unattainable. Reversible, renewable hammer tips and breaker plates of alloy steel. Impact pulverizing—no grinding movement. Adjustable steel grid—so controlled as to permit adjustment while machine is running. Automatic lubrication. Ball and socket bearings —in short, every possible improvement tending toward efficiency, durability and low maintenance expense.

Send for full description

Kennedy Van Saun Mfg. & Eng. Corp.

120 Broadway **New York**

"WE have in the past operated other shovels that are good, but the ERIE is the best, being by far the most substantial. Our first ERIE has been digging and loading hard gravel for three years without any repairs, although we have worn out a dipper."—*(Signed) N. H. Battjes, President, STANDARD BUILDERS' SUPPLY CO., Grand Rapids, Mich.*

The ERIE is the RELIABLE shovel, and gives steady service in the hardest digging. Investigate carefully. Get all of the facts. Pick out the best steam-shovel.

We will be glad to send your our Bulletin P. Write for it. Address:

BALL ENGINE CO., Erie, Pa.
Builders of ERIE Steam-Shovels and Locomotive Cranes.

ERIE Revolving Shovels BALL Engine Co. Erie, Pa.

"Nothing for repairs in three years"

The Kritzer Continuous Lime Hydrator

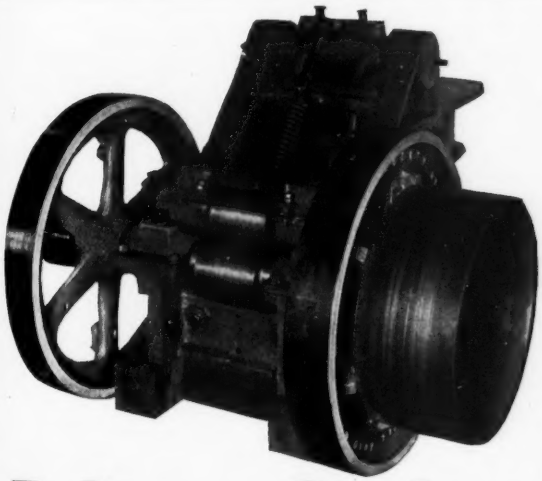
Hydrating Lime

97% of Hydrated Lime is made either by the Old or by the New Kritzer Process. We Guarantee to manufacture the Best Product at the Lowest Possible Cost. Our engineers have worked out every practical improvement in use today in hydrating lime.

It is our business to solve your problems.
It is our business to investigate thoroughly the conditions that prevail at every plant, to work out all the details and to build a plant that will prove a success from the start.

We assume the Responsibility. Now is the time for you to act. Take the matter up with us NOW and we will outline your whole proposition for you.

THE KRITZER COMPANY
503 South Jefferson Street **CHICAGO, ILL.**



Reliance Crushers

IN ALL SIZES FOR EITHER PORTABLE PLANTS FOR ROAD BUILDING OR STATIONARY QUARRY INSTALLATIONS.

BUILT FOR LONG, HARD SERVICE—WILL SAVE YOU MONEY IN THE LONG RUN

Let us quote you prices

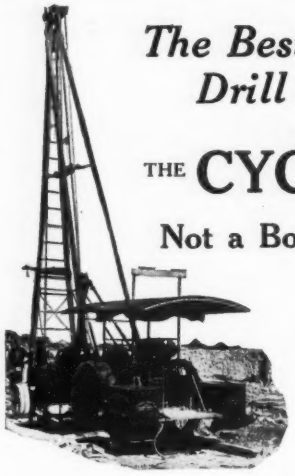
Universal Road Machinery Co., Kingston, N. Y.
Branches in all principal cities in U. S. and Canada
MANUFACTURERS OF THE FAMOUS RELIANCE LINE OF ROAD BUILDING AND QUARRY EQUIPMENT

NATIONAL
Screen Separator

The Leading Screen in
Efficiency
Durability
Simplicity
Capacity

Write for Descriptive Literature to

NATIONAL ENGINEERING COMPANY
549 West Washington Boulevard, Chicago



The Best Blast-Hole Drill on Earth

THE **CYCLONE** No. 14

Not a Boast—A FACT

We will prove the superiority of the No. 14 Drill by placing one of the outfits in your quarry against any or all other makes.

If the Cyclone doesn't out-drill and out-wear all other drills, we will remove it from the work without cost to you.

Our proposition gets below the paint—it eliminates talking points and evaporates hot air. It puts buying on a strictly engineering basis where it belongs.

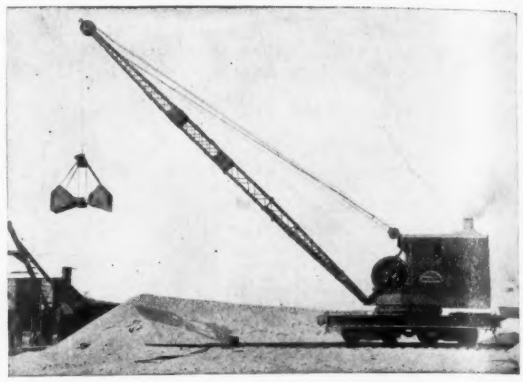
Furnished in Steam, Gasoline, Compressed Air or Electric Power Traction or Non-Traction

Let us send you full particulars

The Sanderson-Cyclone Drill Co.

ORRVILLE, OHIO

Eastern and Export Office 1778 Broadway, New York



O. S. DEPENDABLE
Locomotive Cranes and Buckets

insure satisfaction wherever installed. Correct design, best of materials used with superior fabrication. Catalog No. 16 contains valuable information and is mailed upon application.

Orton & Steinbrenner Co.

Chicago, Ill.

Factory—Huntington, Ind.

Universal Crushers

The biggest value for your money. Universal crushers and pulverizers reduce stone to desired size or fineness in a jiffy!

Fifteen years of designing and building experience have made possible the exceptional ability of Universals.

Universal Crusher Co.
225 Third Street
Cedar Rapids, Iowa, U.S.A.

Ask for Folder 1918

The Clyde Lime Hydrator Performance Counts

The Clyde was first in the field, and through dependable and economical performance is still first choice of lime operators.

The Clyde Hydrator produces big capacities of lime at only three-fifths the cost of any other hydrator on the market.

The Clyde not only produces over 90% of the hydrate of America, but makes the best quality of finishing lime from from either high calcium or magnesium.

Simple, easiest to operate and most economical in cost of installing, maintaining and operating.

Send for Catalog

H. MISCAMPBELL

Patentee and Sole Manufacturer

DULUTH - - MINNESOTA

OHIO

Photo Baker

Photo Edmonston

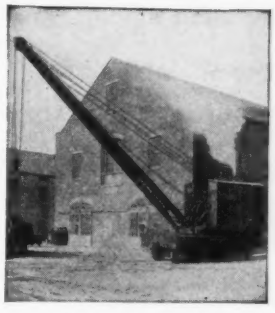
One of these men from OHIO
Will be your choice for President next November

When you are looking for the right locomotive Crane investigate carefully the design, construction, workmanship and record of the

OHIO

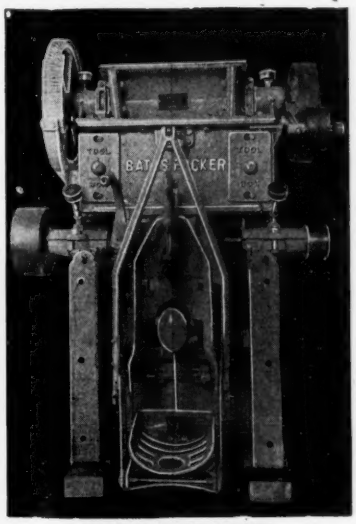
Then make your own comparisons and still another vote will go to

OHIO



OHIO LOCOMOTIVE CRANE CO., BUCYRUS, OHIO

BATES
BAG FILLING MACHINE



SINGLE TUBE MODEL

will reduce your costs in filling bags with pulverized limestone, ground phosphate, gypsum, stucco, cement, Fuller's earth, paint fillers and other pulverized rock products.

Outstanding features of BATES Bag Filling Machines are:

Less Labor
Greater Output
Reduced Cost

Made in four sizes—single tube, two tube, three tube and four tube—respective capacities are 75, 150, 225 and 300 ton per day.

Send for Our Catalog

Bates Valve Bag Company
7310 South Chicago Ave. Chicago, Ill.

HETTRICK

Time, which after all, is the final arbiter of quality, has vindicated thoroughly our insistence on exactness in the most minute details. Hettrick Canvas Belting is giving satisfaction everywhere. It's dependable; always on the job.

Service—Quality—Satisfaction

The Hettrick Mfg. Co., Toledo, Ohio

SCHAFFER
Continuous Lime Hydrators

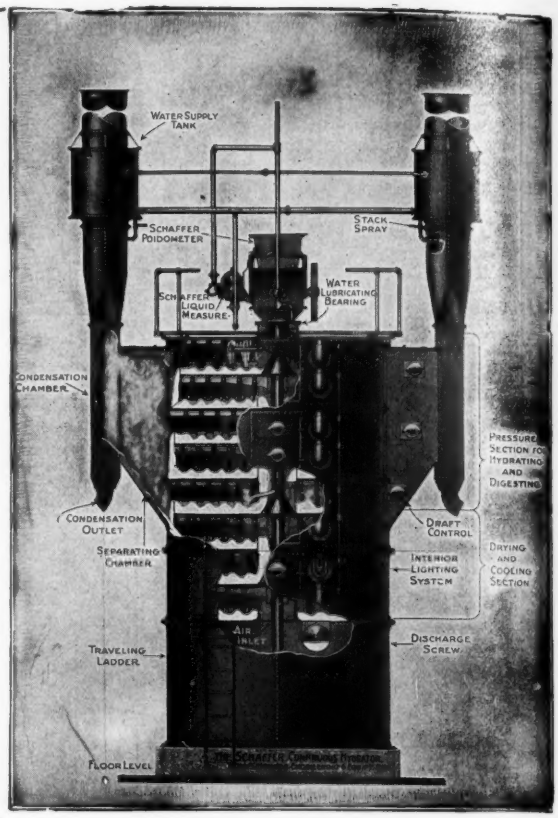
AUTOMATIC operation delivers lime by **weight**, not volume, to the Schaffer Hydrator. Automatically, water, too, is added in correct proportion—insuring a continuous flow of a superior product.

The flexibility of control enables the use of either high calcium or dolomite lime, while at the same time the automatic operation of Schaffer Hydrators solves the labor problem, as they require but little attention.

Our literature on the Schaffer Hydrator covers all the questions you now have in mind. Write for it at once!

Schaffer Engineering & Equipment Co.

Peoples Bank Bldg., PITTSBURGH, PA.

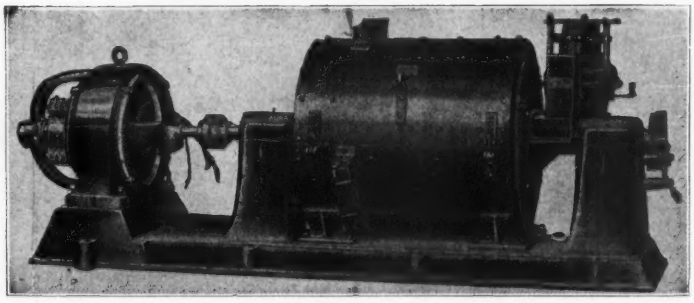


ABSOLUTE SAFETY IN BURNING PULVERIZED COAL

By the Aero System there is no coal pulverized except for instant use. As conditions call for the supply so does the Aero produce the proper quantity. The hazard attendant upon storage of the coal powder is entirely eliminated.

There is nothing between the coal bunker and the furnace except the Aero, its motor and a plain pipe connection. Another feature with the Aero—if the coal supply is sheltered from rain and snow no artificial drying is necessary. Neither must the coal be of a very high grade—low cost slack coal can be made to yield its last B. T. U.

The AERO PULVERIZER



is designed as a complete unit for one furnace. They are built in five standard sizes ranging in capacity from 600 lbs. to 5,000 lbs. of coal per hour. Dust-proof and strongly built. All parts susceptible to wear are easy of access.

BACKED BY THE LONGEST SUCCESSFUL SERVICE

Write for Bulletin

AERO PULVERIZER CO., 120 BROADWAY, NEW YORK

SAND AND GRAVEL PLANTS

To produce a washed product thoroughly cleaned and screened to size you need S-A Equipment.

There are certain fundamental principles involved in S-A Gravel Plant design which insure superior results.

Our engineers are glad to co-operate in the preparation of layouts for new projects and there is no charge for this service.

Stephens-Adamson Mfg. Co., Aurora, Illinois

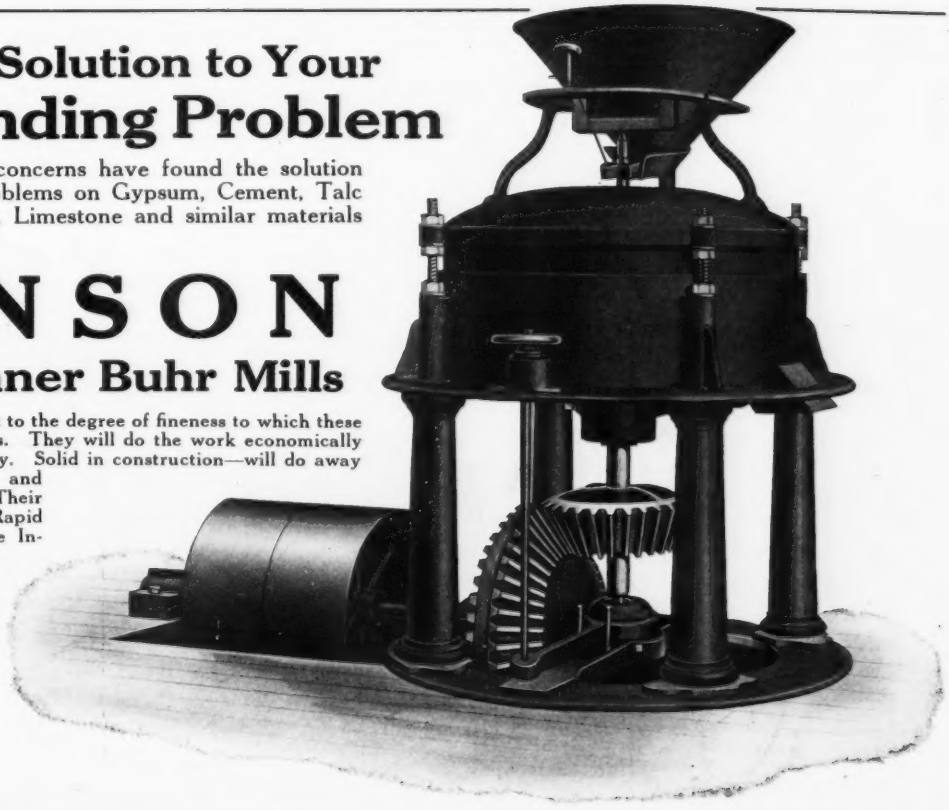
Here is the Solution to Your Fine Grinding Problem

Many of the leading concerns have found the solution to their fine grinding problems on Gypsum, Cement, Talc and Soapstone, Graphite, Limestone and similar materials by installing

MUNSON

Under Runner Buhr Mills

There is practically no limit to the degree of fineness to which these mills will grind these products. They will do the work economically and satisfactorily in every way. Solid in construction—will do away with delays and shut-down and keep out of the repair shop. Their Automatic Adjustment, Rapid Grinding and Perfect Balance Insure good results and fine and uniform grinding.



Why not investigate? Send for our new catalog, number 71.

Munson Mill Machinery Co., Inc.
Utica, New York

AMSCO
"THE TOUGHEST STEEL KNOWN"

Clark Reversible Dipper Tooth

(Patented)

A Heavy Duty Two-part Tooth

THE Clark reversible dipper tooth meets the most severe digging conditions, such as are encountered by the large revolving shovels in stripping the over-burden of coal, ore, etc. Likewise, it does excellent work in ordinary excavating.

The base or shank of the AMSCO Manganese Clark tooth for the large revolving stripping shovel is of the "I" beam construction, such as is shown above. This is particularly recommended for hard service, as it secures maximum strength with minimum weight.

When the Clark points, after long usage have worn to such an extent as to reduce efficiency, they can be reversed, thereby providing a new cutting edge. Only one bolt must be removed to reverse or renew the points. The bolt as you will note from the illustration is a wedge type bolt and is set parallel to the dipper lip. The nut is protected by bosses cast on the base to prevent it from shearing off.

Working under various conditions throughout the country, the AMSCO Manganese Clark reversible tooth has been considered an eminently satisfactory and economical design. It is made entirely of AMSCO Manganese Steel—consequently long life is assured.

Write for information regarding attractive free exchange proposition.

American Manganese Steel Company

General Sales Offices: Chicago Heights, Ill.

District Sales Offices:

New York Chicago Pittsburgh Minneapolis Salt Lake City San Francisco
Denver Los Angeles Seattle Portland, Ore. New Castle, Dela.

WORKS: Chicago Heights, Ill. New Castle, Dela. Oakland, Calif.

Increase Your Production

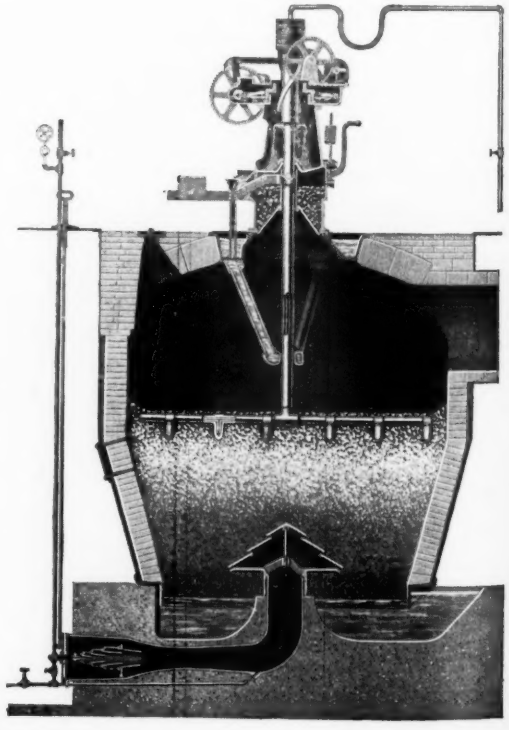
of high grade lime by heating your kilns with producer gas generated in

CHAPMAN Agitator Producers

They deliver a constant supply of high quality gas, thus insuring a uniform temperature in the kiln. This uniform supply of high quality gas burns with a long, clear flame which resembles the flame from a wood fire. The result is a greater production of first grade lime.

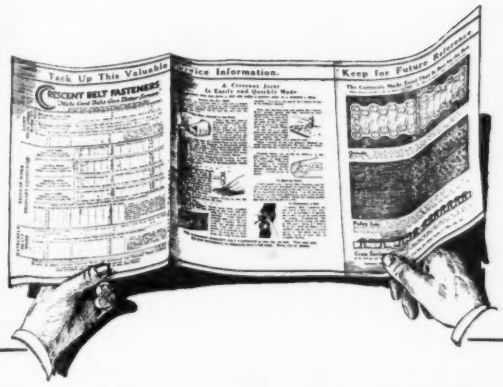
The Chapman Floating Agitator will increase the capacity and the efficiency of hand-poked producers already in operation.

Write us for special information



The Chapman Engineering Company

Oliver Bldg. Pittsburgh — MT. VERNON, OHIO — 11 Broadway New York



Get Your Copy of the Latest Bulletin On Better Belt Service

As a practical man you know that no belt can give better service than its joint.

To enable you to get the *maximum* of service out of your belting, we have prepared this booklet—"Modern Scientific Methods of Belt Joining."

It actually *informs*—rather than argues.

Absolutely devoid of vague theorisms and selling bunkum, it gets right down to brass tacks on the "how" and "why" of making belt joints with Crescent Belt Fasteners that will *hold* for the life of the most durable belt; joints that will not weaken the belt; belt joints that will run the same as endless on the pulley side, without noise, clatter or thumping; belt joints that will insure maximum power transmission and continuous production.

Every condition of belt service is completely and accurately covered, and classified for *instant reference.*

"Modern Scientific Methods of Belt Joining" in your Belt Room will mean dollars in your pocket.

A copy is yours for the asking. Just tell us to send you Booklet N.

Crescent Belt Fasteners will be sent on 30 days' free trial. Advise us the width and thickness and pulley diameters on any drive you would like to try them. No charge or obligation involved, until after 30 days you are entirely satisfied.

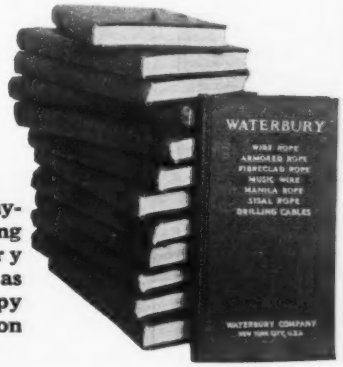
Crescent Belt Fastener Co.
381 Fourth Avenue New York City

Canadian Branch: 32 Front Street, West, Toronto.
England: 32, Paradise Street, Birmingham

CRESCENT
Make Good Belts Give Better Service
BELT FASTENERS

The extraordinary strength of Waterbury Plow Steel Rope assures long life and enables the rope to withstand hard service and rough handling—conditions which shorten the life of ordinary wire cables when used in quarry work.

This extra strength—with Waterbury high quality of material and workmanship (dominant features of every grade of Waterbury Rope)—make Waterbury Plow Steel Rope particularly adaptable for use on hoists, derricks, cableways and inclined planes.



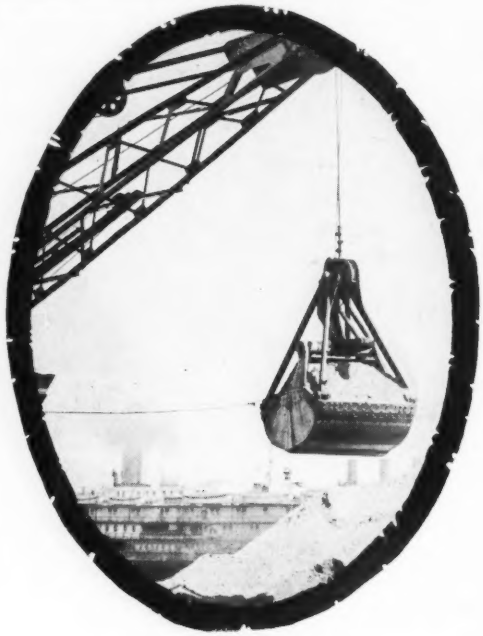
160,000 rope buyers are now using the Waterbury GREEN BOOK as a guide. A copy will be sent free on request.

WATERBURY COMPANY
63 PARK ROW, NEW YORK

Makers of Wire, Armored, Fibre and Fibreclad Rope. Also Music Wire

Chicago	609-613 North La Salle St.
San Francisco	151-161 Main St.
New Orleans	1018 Maison Blanche Bldg.
Dallas, Texas	A. T. Powell & Co.

2400-W



FAMOUS
"BUFFALO"
CLAM SHELL
BUCKETS
STANDARD TYPE

The Bucket That Bites a Full Load With Every Grab

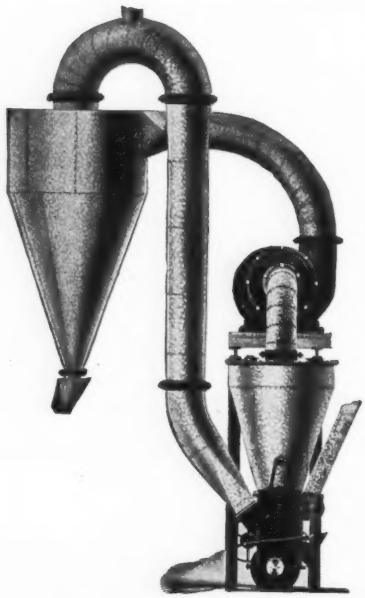
Here is a bucket that performs full service. The Buffalo Equalizing Arm causes the scoops to travel with uniform speed, exerting a tremendous pressure on the scoops during the closing operation, which insures the bucket filling to capacity at every grab. Designed especially for handling sand, gravel, coal and similar bulk materials. Constructed entirely of steel.

Our Engineering Department Is at Your Service. Write for Our Latest Bulletin

Buffalo Hoist & Derrick Company
127 Erie Street Buffalo, New York

Also Manufacturers of Buffalo Hoists and "All Steel" Locomotive Cranes

From the Hardness of Coke to the Softness of a Material Like Lithopone Is a Long Range in Hardness



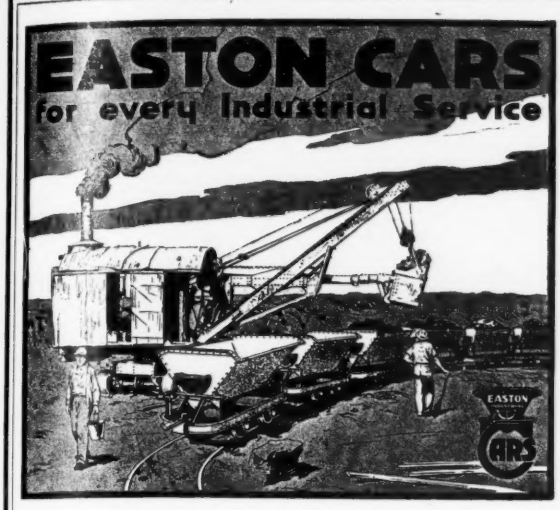
Still Raymond Mills pulverize both with ease and economy to the user. Capacities can be handled from 100 pounds per hour to 8 or 10 tons per hour and with a range of fineness from 80 mesh to 350 mesh.

Our engineering experts are at your service for consultation as to the best method to use for grinding any material and the advice they give is based upon forty years in the fine grinding field.

Raymond Bros. Impact Pulverizer Company

Western Office:
201 Boston Bldg., Denver, Colo.

1301 North Branch St., Chicago, Ill.



Easton Industrial Railway Cars are designed and built by engineers thoroughly familiar with all quarrying requirements.

Easton cars always measure up to the job—whether these cars be standard Rocker Dump, Gable Bottom, Scoop, or Skip, or ones specially designed to meet unusual load or operating conditions.

Easton Service can furnish not only the right kind of a car, but all the rest of an industrial railway equipment—tracks, switches, turnouts, turntables, and ties—equipment which will do the work speedily, efficiently and economically.

The thirty years' experience of Easton Engineers is at your disposal, without fee or obligation. Write them for recommendations

EASTON CAR & CONS'T'N CO

44 Dey Street, New York **Works: Easton, Pa.**

Detroit Pittsburgh Boston Philadelphia Chicago

2087-E

Furnishing Complete Plants for Engineering Developments

PLANTS designed and built under the direct supervision of a single staff of engineers operate more efficiently and satisfactorily than plants equipped with machines produced by different concerns without consideration of the factors effecting synchronization.

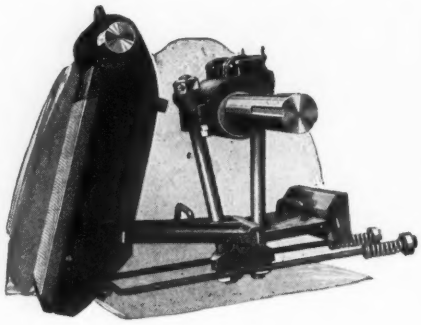
Witness the high efficiency successful performance and operating economy of the many important complete plants designed and built by Allis Chalmers engineers. Consider the importance of a single guarantee covering the satisfactory operation of the entire equipment.

Our Engineers are pleased to be consulted

Allis Chalmers Products

Air Brakes
Air Compressors
Cement Machinery
Coal Mining Machinery
Condensers
Crushing Machinery
Electrical Machinery
Electric Hoists
Farm Tractors
Flour Mill Machinery
Forgings
Gas Engines
Hydraulic Turbines
Mining Machinery
Oil Engines
Perforated Metals
Pumping Machinery
Reciprocating Pumps
Rolling Mill Machinery
Saw Mill Machinery
Steam Engines
Steam Hoists
Steam Turbines
Timber Treating and Preserving Machinery

ALLIS-CHALMERS
Manufacturing Company
Milwaukee, Wis., U. S. A.
District Offices in All Leading Cities.

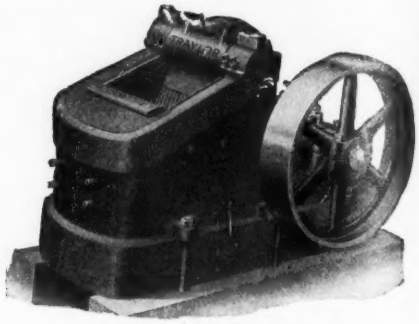


The Lighter but Stronger Pitman
and the
Frictionless Toggle System
Mean 80% Less Friction in

"Bulldog" Jaw Crushers

The Pitman uses two wrought steel rods of *known strength*, in place of an unreliable casting, and the three toggle ends roll on flat steel seats without grinding. These points, as well as the steel-banded frame of unequaled strength and many other exceptional features are fully described in Bulletin R-JX-1.

Send for your copy today



We Announce

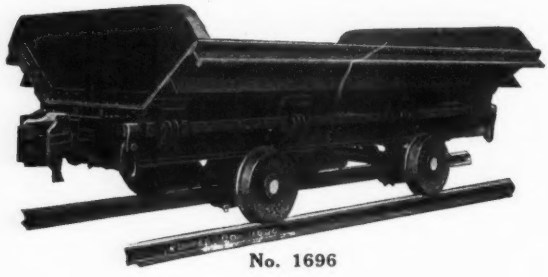
the conversion of our immense shipyard at Cornwells, Pa., into a plant for the manufacture of Motor Trucks and All Purpose Tractors of a quality equal to the best and which average up with the other older and world known Traylor products.

Traylor Engineering & Mfg. Company
Allentown, Pa.

New York, 30 Church St. | Pittsburgh, 211 Fulton Bldg. | Chicago, 1414 Fisher Bldg.
Los Angeles, Citizens Bank Bldg. | Spokane, Mohawk Block

For Delivery From Stock

10x20-in. Jaw Crusher, M. S. Fitted.
2 No. 6 Std. Gyratory Crushers.
8 & 14-in. Bulldog Gyratory Crushers.
42x48-in. Bulldog Jaw Crusher.



No. 1696

Long Life—Continuous Service

The two dominating factors in selecting a car for Quarry Service.

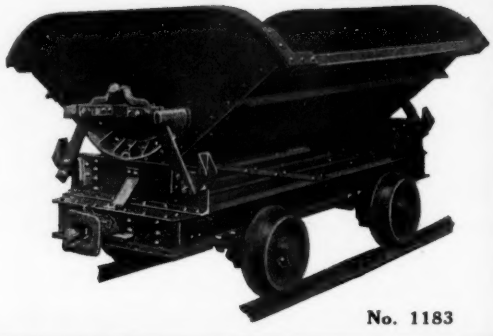
Koppel Quarry Cars

TRADE MARK REGISTERED KOPPEL U. S. PATENT OFFICE

are designed and built to give 100% satisfaction to the operator—to give long life and to eliminate repairs and lay-offs.

KOPPEL cars are designed to meet every Quarry Service.

Write for Complete Bulletins

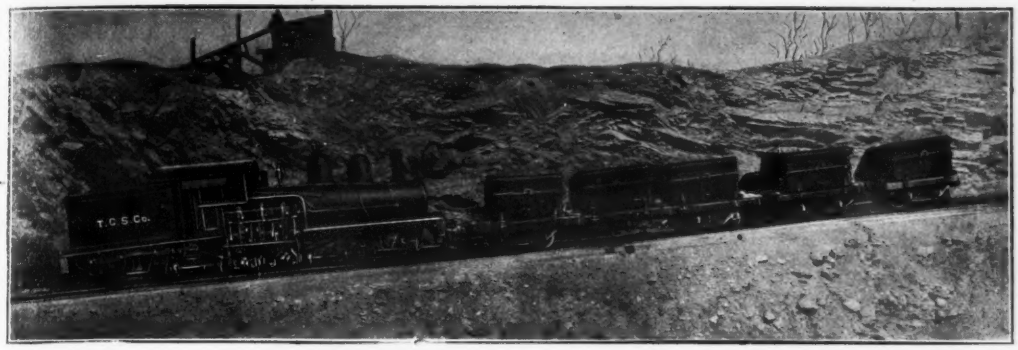


No. 1183

Koppel Industrial Car & Equipment Co.
Koppel, Pa.

SALES OFFICES:

30 Church St., New York City | Peoples Gas Bldg., Chicago | Farmers Bank Bldg., Pittsburgh
Edw. R. Bacon Co., 51 Minna St., San Francisco, Cal. | 1420 Chestnut St., Philadelphia | Book Bldg., Detroit



The "Shay" Will Do It

Because of their flexible geared drive, "Shay" engines will get out rock from places inaccessible to rod engines.

All wheels of a "Shay" are drivers—including the tank wheels.

The "Shay" is the most flexible and powerful kind of motive power you can use.

The power is supplied by the three cylinders, producing a constant torque.

LIMA LOCOMOTIVE WORKS, Inc.

LIMA, OHIO **30 Church Street, New York**

Short-Cuts Pay

UNLOADING material and feeding the paving machine in one operation is an example of the time- and labor-saving possibilities of the Auto-Crane.

It unloads cars and loads trucks, excavates with dragline, clamshell or orange-peel, is ready for a quick change to hook, skip, magnet or pile-driver. And it moves from job to job under its own power.

There's an Auto-Crane for every need — mounted on crawlers, road wheels or rail trucks, operating by "gas", steam or electricity—whichever is most convenient.

Thirty-five years of success with other lines led to standardization on this compact, powerful machine—the all-'round "handy man" for contractors. Write us *your* needs. We'll gladly tell you how Auto-Cranes "fit in."

AUTO-CRANE

BECKWITH PATENTS

The John F. Byers Machine Co.

310 Sycamore Street, Ravenna, Ohio

Sales Representatives in 25 Leading Cities

Buyers' Guide of the Rock Products Industry

Classified Directory of Advertisers in Rock Products

Air Compressors
Worthington Pump & Mach. Co.
New York, N. Y.

Bags and Bag Machinery
Bates Valve Bag Co.
Chicago, Ill.
Jaite Co., The
Jaite, Ohio
Valve Bag Co. of America
Toledo, Ohio.

Belting
Cincinnati Rubber Mfg. Co.
Cincinnati, Ohio.
Hettrick Mfg. Co.
Toledo, Ohio
Main Belting Co.
Philadelphia, Pa.
New York Belting & Packing Co.
New York, N. Y.
U. S. Rubber Co.
New York, N. Y.

Belt Fasteners
Crescent Belt Fastener Co.
New York, N. Y.

Belt Lacing
Crescent Belt Fastener Co.
New York, N. Y.

Belt Rivets
Crescent Belt Fastener Co.
New York, N. Y.

Bins, Storage
Preston Co., I. M.
Lansing, Mich.

Brick Machines
General Service Corp.
Chicago, Ill.
Wert Mfg. Co.
Chicago, Ill.

Blasting Supplies
Aetna Explosives Co.
New York, N. Y.
Atlas Powder Co.
Philadelphia, Pa.
Du Pont de Nemours & Co., E. I.
Wilmington, Del.
Grasselli Powder Co.
Cleveland, Ohio.

Buckets, Elevator
Hendrick Mfg. Co.
Carbondale, Pa.
Orton & Steinbrenner
Chicago, Ill.

Buckets
Advance Eng. Co.
Cleveland, O.
Brown Hoisting Mach. Co.
Cleveland, Ohio.
Browning Co.
Cleveland, Ohio.
Buffalo Hoist & Derrick Co.
Buffalo, N. Y.
Marion Steam Shovel Co.
Marion, Ohio.
McMyler Interstate Co.
Cleveland, Ohio.
Owen Bucket Co.
Cleveland, Ohio.

Calcining Machinery
Atlas Car & Mfg. Co.
Cleveland, Ohio.
Butterworth & Lowe
Grand Rapids, Mich.

Chains and Transmitting Machinery
Columbus-McKinnon Chain Co.
Columbus, O.
U. S. Chain & Forging Co.
Pittsburgh, Pa.

Chains, Dredge
U. S. Chain & Forging Co.
Pittsburgh, Pa.

Clips, Wire Rope
American Hoist & Derrick Co.
St. Paul, Minn.

Conveyors and Elevators
Caldwell H. W., & Son Co.
Chicago, Ill.
Gifford-Wood Co.
Hudson, N. Y.
Jeffrey Mfg. Co., The
Columbus, Ohio.
Link Belt Co.
Chicago, Ill.
Portable Machinery Co.
Passaic, N. J.
Robins Conveying Belt Co.
New York, N. Y.
Smith Eng. Works
Milwaukee, Wis.
Stephens-Adamson Mfg. Co.
Aurora, Ill.
Sturtevant Mill Co.
Boston, Mass.
Universal Road Mach. Co.
Kingston, N. Y.
Webster Mfg. Co.
Chicago, Ill.

Cranes—Locomotive Gantry
American Crane & Eng. Co.
Toledo, Ohio.
American Hoist & Derrick Co.
St. Paul, Minn.
Advance Eng. Co.
Cleveland, O.
Ball Engine Co.
Erie, Pa.
Brown Hoisting Mach. Co.
Cleveland, Ohio.
Browning Co.
Cleveland, Ohio.
Byers Mach. Co., John F.
Ravenna, Ohio.
Chisholm-Moore Mfg. Co.
Cleveland, Ohio.
McMyler-Interstate Co.
Cleveland, Ohio.
Ohio Locomotive Crane Co.
Bucyrus, Ohio.
Orton & Steinbrenner
Chicago, Ill.
Osgood Co., The
Marion, Ohio.

Crushers and Pulverizers
Allis-Chalmers Mfg. Co.
Milwaukee, Wis.
American Pulverizer Co.
St. Louis, Mo.
Austin Mfg. Co.
Chicago, Ill.
Bacon, Earle C., Inc.
New York, N. Y.
Buchanan Co., Inc., C. G.
New York, N. Y.
Bradley Pulverizer Co.
Allentown, Pa.
Butterworth & Lowe
Grand Rapids, Mich.
Chalmers & Williams
Chicago Heights, Ill.
Fuller-Lehigh Co.
Fullerton, Pa.
Gruendler Pat. Crusher & Pulv. Co.
St. Louis, Mo.
Jeffrey Mfg. Co., The
Columbus, Ohio.
K. B. Pulverizer Co.
New York, N. Y.
Kennedy-Van Saun Mfg. & Eng. Corp.
New York, N. Y.
Kent Mill Co.
Brooklyn, N. Y.
Lewistown Fdry. & Mach. Co.
Lewistown, Pa.
McLanahan-Stone Mach. Co.
Hollidaysburg, Pa.
Munson Mill Machinery Co.
Utica, N. Y.
Pennsylvania Crusher Co.
Philadelphia, Pa.
Raymond Bros. Impact Pulverizer Co.
Chicago, Ill.
Smidth & Co., F. L.
New York, N. Y.
Smith Eng. Works
Milwaukee, Wis.
Sturtevant Mill Co.
Boston, Mass.
Traylor Eng. & Mfg. Co.
Allentown, Pa.
Universal Crusher Co.
Cedar Rapids, Iowa.
Universal Road Mach. Co.
Kingston, N. Y.
Webb City & Carterville F. & M. Works
Webb City, Mo.
Williams Pat. Crush. & Pulv. Co.
Chicago, Ill.
Worthington Pump & Mach. Corp.
New York, N. Y.

Derricks
American Hoist & Derrick Co.
St. Paul, Minn.
Buffalo Hoist & Derrick Co.
Buffalo, N. Y.
Terry Mfg. Co.
New York, N. Y.

Dipper Teeth
American Manganese Steel Co.,
Chicago Heights, Ill.

Dragline Buckets
Brown Hoisting Mach. Co.
Cleveland, Ohio

Drills
American Well Works
Aurora, Ill.
Sanderson Cyclone Drill Co.
Orrville, Ohio
Wood Drill Works
Paterson, N. J.

Dryers
American Process Co.
New York City.
Ruggles-Coles Eng. Co.
New York, N. Y.
Vulcan Iron Works
Wilkes-Barre, Pa.

Dynamite
Aetna Explosives Co.
New York, N. Y.
Atlas Powder Co.
Philadelphia, Pa.
Du Pont de Nemours & Co., E. I.
Wilmington, Del.
Grasselli Powder Co.
Cleveland, Ohio.

Engines, Oil & Gas
Worthington Pump & Mach. Co.
New York, N. Y.

Engines, Steam
Morris Mach. Works
Baldwinsville, N. Y.

Engineers
Arnold & Weigel
Woodville, Ohio
Bacon, Earle C., Inc.
New York, N. Y.
Bradley Pulv. Co.
Allentown, Pa.
Buckbee Co., J. C.
Chicago, Ill.
Fuller Engineering Co.
Allentown, Pa.
James N. Hatch
Chicago, Ill.
R. W. Hunt & Co.
Chicago, Ill.
Massey Co., Geo. B.
Chicago, Ill.
Ross Engineering Co.
Chicago, Ill.
Smidth & Co., F. L.
New York, N. Y.
Schaffer Eng. & Equip. Co.
Pittsburgh, Pa.
Yates, Preston K.
New York, N. Y.

Excavators
Ball Engine Co.
Erie, Pa.
Green, L. P.
Chicago, Ill.
Marion Steam Shovel Co.
Marion, Ind.
Owen Bucket Co.
Cleveland, Ohio.

Excavators—Dragline Cableway
Link Belt Co.
Chicago, Ill.
Sauerman Bros.
Chicago, Ill.

Explosives
Aetna Explosives Co.
New York, N. Y.
Atlas Powder Co.
Philadelphia, Pa.
Du Pont de Nemours & Co., E. I.
Wilmington, Del.
Grasselli Powder Co.
Cleveland, Ohio.

Fuses
Ensign-Bickford Co.
Simsbury, Conn.

Gas Producers
Chapman Eng. Co.
Mt. Vernon, Ohio.

Gears
Caldwell, H. W. & Son Co.
Chicago, Ill.

Glass Sand Equipment
Lewistown Fdy. & Mach. Co.
Lewistown, Pa.

Grinding Mills
Munson Mill Machinery Co.
Utica, N. Y.

Hoists
American Hoist & Derrick Co.
St. Paul, Minn.
Buffalo Hoist & Derrick Co.
Buffalo, N. Y.
Chisholm-Moore Mfg. Co.
Cleveland, Ohio
Vulcan Iron Works
Wilkes-Barre, Pa.

Hose—Water, Steam, Air Drill, Pneumatic Tool
Cincinnati Rubber Mfg. Co.
Cincinnati, O.
N. Y. Belting & Packing Co.
New York, N. Y.

Hydrating Machinery
Atlas Car & Mfg. Co.
Cleveland, Ohio
Kritzer Co., The
Chicago, Ill.
Miscampbell, H.
Duluth, Minn.
Schaffer Eng. & Equip. Co.
Pittsburgh, Pa.

Hydraulic Dredges
Morris Machine Works
Baldwinsville, N. Y.

Industrial Cars
Atlas Car & Mfg. Co.
Cleveland, Ohio
Continental Car Co.
Louisville, Ky.
Easton Car & Constr. Co.
Easton, Pa.
Koppel Indust. Car & Equip. Co.
Koppel, Pa.
Watt Mining Car Wheel Co.
Barnesville, Ohio

Lime Kilns
Arnold & Weigel
Woodville, Ohio
Steacy-Schmidt Mfg. Co.
York, Pa.
Vulcan Iron Works
Wilkes-Barre, Pa.

Loaders and Unloaders
Austin Machinery Corp.
Chicago, Ill.
Ball Engine Co.
Erie, Pa.
Gifford-Wood Co.
Hudson, N. Y.
Jeffrey Mfg. Co., The
Columbus, Ohio
Portable Mach. Co.
Passaic, N. J.

Locomotives
Baldwin Locomotive Works, The
Philadelphia, Pa.
Fate-Root-Heath Co.
Plymouth, Ohio
Jeffrey Mfg. Co., The
Columbus, Ohio
Lima Locomotive Works
New York, N. Y.
Porter Co., H. K.
Pittsburgh, Pa.
Vulcan Iron Works
Wilkes-Barre, Pa.
Whitcomb Co., Geo. D.
Rochelle, Ill.

Motors, Electric
Gifford-Wood Co.
Hudson, N. Y.

Motor Trucks
Duplex Truck Co.
Lansing, Mich.
Packard Motor Car Co.
Detroit, Mich.
Pierce-Arrow Motor Car Co.
Buffalo, N. Y.

Packing—Sheet, Piston, Superheat, Hydraulic
Cincinnati Rubber & Mfg. Co.
Cincinnati, Ohio
N. Y. Belting & Packing Co.
New York, N. Y.

Paint and Coatings
Williams, C. K., & Co.
Easton Pa.

Perforated Metals
Chicago Perforating Co.
Chicago, Ill.
Cross Eng. Co.
Carbondale, Pa.
Hendrick Mfg. Co.
Carbondale, Pa.
Nortmann Duffke Co.
Milwaukee, Wis.

Plaster Machinery
Butterworth & Lowe
Grand Rapids, Mich.
Ehrsam & Sons Co., J. B.
Enterprise, Kan.

Portable Conveyors
Portable Machinery Co.
Passaic, N. J.
Stephens-Adamson Mfg. Co.
Aurora, Ill.

Portable Stone Bins
Austin Mfg. Co.
Chicago, Ill.

Pumps
American Manganese Steel Co.
Chicago Heights, Ill.
American Well Works
Aurora, Ill.
Morris Machine Works
Baldwinsville, N. Y.
Worthington Pump & Mach. Co.
New York, N. Y.

Power Transmitting Machinery
Caldwell H. W., & Son Co.
Chicago, Ill.

Powder
Aetna Explosives Co.
New York, N. Y.
Atlas Powder Co.
Philadelphia, Pa.
Du Pont de Nemours & Co., E. I.
Wilmington, Del.
Grasselli Powder Co.
Cleveland, Ohio

Pulverized Fuel Equipment
Aero Pulv. Co.
New York, N. Y.
Bradley Pulv. Co.
Allentown, Pa.
Raymond Bros. Impact Pulv. Co.
Chicago, Ill.

Pump Valves
N. Y. Belting & Packing Co.
New York, N. Y.

Quarry Equipment
Marion Steam Shovel Co.
Marion, Ohio
Universal Road Mach. Co.
Kingston, N. Y.

Rails
Hyman-Michaels Co.
Chicago, Ill.

Rope, Wire
American Steel & Wire Co.
Chicago, Ill.
Leschen, A., & Sons Co.
St. Louis, Mo.
Waterbury Co.
New York, N. Y.

Scrapers, Drag
Sauerman Bros.
Chicago, Ill.

Screens
Austin Mfg. Co.
Chicago, Ill.
Cross Eng. Co.
Carbondale, Pa.
Gifford-Wood Co.
Hudson, N. Y.
Hendrick Mfg. Co.
Carbondale, Pa.
Jeffrey Mfg. Co., The
Columbus, Ohio
Link Belt Co.
Chicago, Ill.
National Engineering Co.
Chicago, Ill.
Ross Eng. Co.
Chicago Ill.
Smith Eng. Works
Milwaukee, Wis.
Stephens-Adamson Mfg. Co.
Aurora, Ill.
Stimpson Equip. Co.
Salt Lake City, Utah
Sturtevant Mill Co.
Boston, Mass.
Tyler Co., The W. S.
Cleveland, Ohio
Universal Road Mach Co.
Kingston, N. Y.

Separators
National Engineering Co.
Chicago, Ill.
Raymond Bros. Impact Pulv. Co.
Chicago, Ill.
Sturtevant Mill Co.
Boston, Mass.
Tyler Co., The W. S.
Cleveland, Ohio

Separators, Magnetic
Buchanan Co., C. G., Inc.
New York, N. Y.

Shovels—Steam and Electric
Ball Engine Co.
Erie, Pa.
Marion Steam Shovel Co.
Marion, Ohio
Osgood Co., The
Marion, Ohio

Speed Reducing Transmission
James, D. O., Mfg. Co.
Chicago, Ill.

Stone Elevators
Austin Mfg. Co.
Chicago, Ill.

Testing Sieves and Testing Sieve Shakers
Tyler Co., The W. S.
Cleveland, Ohio

Track Equipment
Central Frog & Switch Co.
Cincinnati, Ohio

Trolleys
Brown Hoisting Mach. Co.
Cleveland, Ohio

Washers, Sand and Gravel
Link Belt Co.
Chicago, Ill.
Smith Eng. Works
Milwaukee, Wis.

Wire Rope
American Steel & Wire Co.
Chicago, Ill.
Leschen, A., & Sons Co.
St. Louis, Mo.
Waterbury Co.
New York, N. Y.

Wire Cloth
Cleveland Wire Cloth Co.
Cleveland, Ohio
Tyler Co. The W. S.
Cleveland, Ohio

Free Service to Readers of

Rock Products

If you are in the market for any kind of machinery, equipment or supplies, or if you desire catalogs, information or prices on any product, simply check off your wishes on the following list and mail to ROCK PRODUCTS. We are at your service—to obtain for you, without expense, catalogs, prices or specific information on every kind of machinery, equipment and supplies—or to help you find the hard to find source of supply. Instead of writing to many concerns or spending time hunting up information, etc., the one request to ROCK PROUCTS brings the complete data you desire.

What can we do for you? Use the following list for convenience. Check what you are in the market for, sign and mail to us.

RESEARCH SERVICE DEPARTMENT

ROCK PRODUCTS, 542 So. Dearborn St., Chicago, Illinois

Please send me catalogs and prices concerning the following items checked below:

..... Air Compressors.
..... Anvils.
..... Bags.
..... Bag Printing Machines.
..... Bagging Machines.
..... Belt Dressings.
..... Belting, Conveying.
..... Belting, Transmission.
..... Bins.
..... Bin Gates.
..... Blast Hole Drills.
..... Blasting Powder.
..... Bodies, Motor Truck.
..... Boilers.
..... Buckets.
..... Buildings, Portable.
..... Cable Coatings.
..... Cableways.
..... Calcining Machinery.
..... Cars.
..... Car Pullers.
..... Car Replacers.
..... Chain Drive.
..... Chain Hoists.
..... Chains, Steel.
..... Clips, Wire Rope.
..... Clutches.
..... Compressors.
..... Conveying Equipment.
..... Conveyors.
..... Cranes.
..... Crusher, Parts.
..... Crushing Plants.
..... Crushers.
..... Derricks.
..... Dragline Excavators.
..... Dragline Cableway Excavators.
..... Dredging Pumps.
..... Drill Steel.
..... Drill Sharpening Machinery.
..... Drills, Blast Hole.
..... Drills, Hand Hammer.
..... Drills, Tripod.
..... Dryers, Sand and Stone.
..... Dynamite.
..... Dump Cars.
..... Dump Wagons.
..... Dust Collecting Systems.
..... Elevators and Conveyors.
..... Elevating Equipment.
..... Engineering Service.
..... Engines, Gasoline.
..... Engines, Oil.
..... Fire Brick.
..... Forges.
..... Frogs and Switches.
..... Gas Producers.
..... Gear Speed Reducers.
..... Gears.
..... Generators, Electric.
..... Hand Shovels.
..... Hoisting Engines.
..... Hoists.
..... Hose, Air Drill.
..... Hose, Pneumatic Tool.
..... Hose, Steam.
..... Hose, Water.
..... Hydraulic Dredges.
..... Industrial Railways.
..... Lathes.
..... Lights, Carbide.
..... Lime Hydrators.
..... Lime Kilns.
..... Loaders, Car.
..... Loaders, Wagon.
..... Locomotive Cranes.
..... Locomotives, Electric.
..... Locomotives, Gasoline.
..... Locomotives, Steam.
..... Locomotives, Storage Battery.
..... Machine Shop Equipment.
..... Magnetic Separators.
..... Motors.
..... Motor Trucks.
..... Oil Storage.
..... Oils and Lubricants.
..... Packing, Hydraulic.
..... Packing, Piston.
..... Packing, Sheet.
..... Packing, Superheat.
..... Paints and Coatings.
..... Perforated Metal.
..... Picks.
..... Pipe, Iron.
..... Power Transmitting Equipment.
..... Pulleys.
..... Pulverizers.
..... Pumps, Centrifugal.
..... Pumps, Electric.
..... Pumps, Gasoline.
..... Pumps, Steam.
..... Pyrometers.
..... Rails.
..... Rock Drills.
..... Rope Drive.
..... Rope, Manila.
..... Safety Clothing, Etc.
..... Sand-Lime Brick Mchy.
..... Sand Pumps.
..... Sand Washing Boxes.
..... Scrapers.
..... Screening Equipment.
..... Screening Plants.
..... Screens.
..... Sheaves.
..... Steam Shovels.
..... Steel, High Speed.
..... Steel, Manganese.
..... Stokers, Automatic.
..... Stone Grapple.
..... Tanks, Steel.
..... Tanks, Wood.
..... Time Clocks.
..... Tracks.
..... Track Material.
..... Transformers, Electric.
..... Trip Hammers.
..... Unloaders.
..... Valves.
..... Washing Equipment.
..... Weighing Equipment.
..... Welding, Electric.
..... Welding, Oxy-Acetylene.
..... Winches.
..... Wire Cloth.
..... Wire Rope.
..... Wrenches.

Where Can I Buy.....

Who Manufactures .....

Am in the Market for.....

Name .....

Address .....

City .....State .....

INDEX TO ADVERTISEMENTS

Aero Pulverizer Co. 68
Aetna Explosives Co. 80
Allis-Chalmers Mfg. Co. 73
American Crane & Eng. Co. 58
American Hoist & Derrick Co. 6
American Manganese Steel Co. 70
American Process Co. Inside front cover
American Well Works 61
Arnold & Weigel 62
Atlas Car & Mfg. Co. 62

Bacon, Earle C., Inc. 59
Baldwin Locomotive Works 59
Ball Engine Co. 65
Bates Valve Bag Co. 67
Browning Co., The 9
Buchanan Co., C. G. Front cover
Buckbee Co., J. C. 60
Buffalo Hoist & Derrick Co. 72
Buyers Guide 76-77
Byers Machine Co., John F. 75

Caldwell, H. W., & Sons Co. 63
Central Switch & Frog Co. 59
Chalmers & Williams 4
Chapman Engineering Co. 70
Chicago Perforating Co. 59
Classified Advertising 55
Cleveland Wire Cloth Co. 59
Columbus McKinnon Chain Co. 59
Continental Car Co. Inside back cover
Crescent Belt Fastener Co 71
Cross Engineering Co. 63

Easton Car & Const. Co. 73
Ehrsam, J. B., & Sons Mfg. Co. 60
Equipment Corp. of America 56
Erie Steam Shovel Co. 65

Fate-Rooth-Heath Co. 3
Fuller-Lehigh Co. 64

Gifford-Wood Co. 62
Grasselli Powder Co. 13
Gruendler Pat. Crusher & Pulv. Co. Inside front cover

Hatch, James N. 60
Hendrick Mfg. Co. 64
Hettrick Mfg. Co. 67
Hunt & Co., Robt. W. 60
Hyman-Michaels Co. 60

Jaite Co., The Inside front cover
Jeffrey Mfg. Co. 7

K.-B. Pulverizer Co., Inc. 61
Kennedy-Van Saun Mfg. & Eng. Corp. 64
Kleinhans Co., H. 57
Koppel Industrial Car & Equip Co. 74
Kritzer Co., The 65

Leschen A., & Sons Inside back cover
Lewistown Fdy. & Mch. Co. Inside back cover
Lima Locomotive Co. 75
Link Belt Co. 12

Marion Steam Shovel Co. 10
Massey Co., Geo. B. 60
McMyler Interstate Co. 64
Miscampbell, H. 66
Munson Mill Machinery Co., Inc. 69

National Engineering Co. 65
Nortmann-Duffke Co. 60

Ohio Locomotive Crane Co. 67
Orton & Steinbrenner 66
Owen Bucket Co. 59

Pennsylvania Crusher Co. Inside front cover
Porter Co., H. K. 61

Raymond Bros. Impact Pulv. Co. 72
Ruggles Coles Eng. Co. Inside front cover

Sanderson Cyclone Drill Co. 66
Sauerman Bros. Co. 63
Schaffer Eng. & Equip. Co., The 68
Smith Engineering Works 15
Steacy-Schmidt Mfg. Co. Inside front cover
Stephens-Adamson Mfg. Co. 69
Stimpson Equip Co. 5
Sturtevant Mill Co. 14

Terry Mfg. Co. 59
Traylor Engineering & Mfg. Co. 74
Tyler Co., The W. S. 16

Universal Crusher Co. 66
Universal Road Mach. Co. 65
Used Equipment 56-57-58

Valve Bag Co. of America Back cover
Vulcan Iron Works 11

Waterbury Co. 71
Watt Mining Car Wheel Co., The 61
Webb City & Carterville Foundry & Machine Co. 62
Webster Mfg. Co. 8
Whitcomb Co., Geo. D. 63
Wood Drill Works 61
Worthington Pump & Mach. Corp. 1

YOU PRODUCERS

can keep in closer touch with the industry if you will read each issue of ROCK PRODUCTS.

—it brings the news of the field first.
—it is the business and technical journal of the industry.

USE THE COUPON

ROCK PRODUCTS
542 So. Dearborn St., Chicago, Ill.

We produce:

☐ Crushed Stone ☐ Gypsum
☐ Sand & Gravel ☐ Phosphate
☐ Glass Sand ☐ Cement
☐ Lime ☐ Plaster

Please enter my subscription to ROCK PRODUCTS for..... years ($2.00 one year, $3.00 two years).

I enclose $.....to cover.

My name is.....

My address is.....

City..... State.....

(Canadian and Foreign Subscriptions $3.00 a Year)

For Perfect Results— A POWERFUL Detonator

Lion Brand Blasting Caps

Dynamite must be *shocked* into explosion, not merely ignited. And the force of the shot depends entirely on the violence with which the blasting cap detonates the charge. The blasting cap itself must be *a high power explosive of quick, dependable action.*

Years of practical use have proven that *Fulminate of Mercury* is the one detonating compound that possesses the necessary violence for a small blasting cap charge, besides being entirely immune from chemical and physical deterioration. It is with this powerful explosive that Lion Blasting Caps are charged.

Lion Blasting Caps give highest impetus to the explosion and, because of their quick and complete action, minimize the chance of misfires. They get *full* action out of your dynamite.

Made for firing by fuse or electricity.

Write for booklet

AETNA EXPLOSIVES COMPANY
Incorporated
165 Broadway, New York

BRANCHES

Birmingham, Ala. Buffalo, N. Y. Chicago, Ill. Denver, Colo. Duluth, Minn.
Joplin, Mo. Louisville, Ky. Norristown, Pa.
Pittsburgh, Pa. Pottsville, Pa. Roanoke, Va. St. Louis, Mo. Wilkesbarre, Pa.

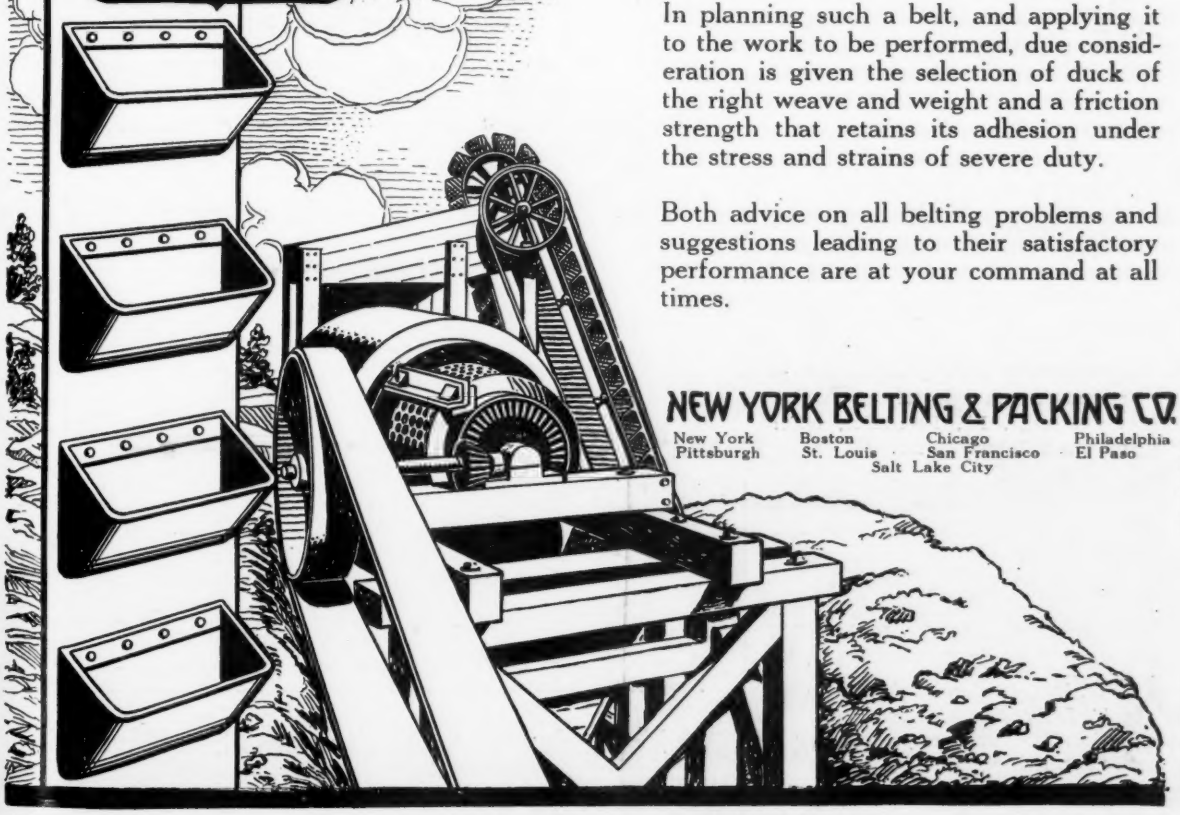
AETNA
It Does the Work!

NEW YORK BELTING & PACKING COMPANY

NEW YORK BELTING & PACKING CO. FOUNDED 1846 INCORPORATED 1856

Rubber Goods for the Rock Products Industry

Conveyor Belting
Elevator Belting
Test Special Transmission Belting
Indestructible Air Drill Hose
Indestructible Water Hose
Indestructible Steam Hose
Firo Superheat Sheet Packing
Indestructible White Sheet Packing
Cobbs Piston Packing



Elevator Belting With Strength and Endurance Built Into It—

The toughest elevating proposition in your plant—whether it be wet or dry work—can be satisfactorily taken care of with New York Belting & Packing Company's specially constructed elevator belting for heavy service.

In planning such a belt, and applying it to the work to be performed, due consideration is given the selection of duck of the right weave and weight and a friction strength that retains its adhesion under the stress and strains of severe duty.

Both advice on all belting problems and suggestions leading to their satisfactory performance are at your command at all times.

NEW YORK BELTING & PACKING CO.

New York Boston Chicago Philadelphia
Pittsburgh St. Louis San Francisco El Paso
Salt Lake City

When writing advertisers please mention ROCK PRODUCTS